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November 29, 2018

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Re: *Ex parte* presentation in RM-11659, Permit Origination of Programming on FM Booster Stations; MB 17-105, Modernization of Media Regulation Initiative

Dear Ms. Dortch:

On November 27, 2018, Chris Devine, Rick Bonick, and Bill Hieatt of Geo Broadcast Solutions, LLC ("Geo Broadcast"), Rick Ducey of BIA Advisory Services, Bert Goldman of Goldman Engineering Management, LLC, and the undersigned met with Al Shuldiner, Chief, Audio Division and Jim Bradshaw, Senior Deputy Chief, Audio Division. Later that day, Messrs. Devine, Bonick, Hieatt, Goldman, and Waldron met with Alison Nemeth Steger, Media Advisor to Chairman Pai. The parties urged the Commission to issue a Notice of Proposed Rulemaking to update the Commission's rules and allow radio broadcasters, on a voluntary basis, to enjoy some of the same advantages that TV broadcasters have gained from Commission approval of ATSC 3.0 with its ability for delivering locally-targeted news, weather, traffic, emergency alerts, and advertising information to consumers. Radio is the *only mass medium* that cannot target its content. It is time for radio broadcasters to have the opportunity to participate in the future of the media ecosystem.

I. Summary and Background

This proceeding was initiated in response to a petition for rulemaking filed by Geo Broadcast in April 2012 ("Rulemaking Petition"). In the Rulemaking Petition, Geo Broadcast asked the Commission to amend Section 74.1231(i) to *permit* (but not require) booster radio stations to originate some of their own programming in such a manner that the booster station could insert localized content (such as localized ads, news, weather, emergency information) at

specific times and otherwise retransmit the primary station's signal.[1] Critically, this can be accomplished with one simple rule change and requires no changes or waivers of the Commission's rules on interference. The rule change would enable broadcasters to take advantage of technology that has been developed to insert localized content at the booster level. This system—called ZoneCasting™—can provide hyperlocal content in a manner that does not cause harmful self-interference between either the station's main transmitter and the booster cluster or among the boosters themselves; moreover, the system is synchronized in a manner that presents a near-seamless experience for radio listeners. Importantly, those listeners would not need to make any upgrades or purchase any new equipment to enjoy the benefits of ZoneCasting; it is both backwards and forward compatible and works with both analog and digital radios in cars and homes across the country today.

When the Commission put the Rulemaking Petition on public notice, the comments were supportive, and included input from the broadcasting industry,[2] small businesses,[3] and elected officials.[4] As the Rulemaking Petition explained, the benefits of such a rule change that would give broadcasters *the option* of using boosters in this manner are numerous.

- *First*, broadcasters would be able to air hyper-localized content to different areas of their community of license, such as geo-targeted weather, hyper-local news, alternate language programming, and targeted emergency alerts. The Commission recognized the value of this "enhanced capability" for television broadcasters in its 2017 order authorizing the voluntary deployment of ATSC 3.0,[5] and the benefits to consumers are clear.

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[1] Section 74.121(i) provides that FM broadcast booster stations may only retransmit the signals of their primary station. 47 C.F.R. § 74.121(i).

[2] *See, e.g.*, Comments of Alta Communications, RM-11659 (filed May 21, 2012); Comments of Gerald R. Page Corporation, RM-11659 (filed May 22, 2012); Comments of Harris Corporation, Broadcast Communications Division, RM-11659 (filed May 23, 2012); Comments of Wennes Communications Stations Inc., RM-11659 (filed May 16, 2012); Comments of William K. Lisecky, RM-11659 (filed May 21, 2012).

[3] *See, e.g.*, Comments of DynaWash LLC, RM-11659 (filed May 22, 2012); Comments of Quantum Advertising, RM-11659 (filed May 21, 2012).

[4] *See, e.g.*, Comments of the National Black Caucus of Local Elected Officials ("NBC-LEO"), RM-11659 (filed May 22, 2012); Comments of the National Association of Black County Officials ("NABCO"), RM-11659 (filed May 22, 2012); Comments of the National Organization of Black Elected Legislative Women ("NOBEL/Women"), RM-11659 (filed May 22, 2012);

[5] Authorizing Permissive Use of the "Next Generation" Broadcast Television Standard, R&O and FNPRM, GN Docket No. 16-142, ¶ 23 (Nov. 20, 2017) ("ATSC 3.0 R&O").

- *Second*, broadcasters would be able to offer advertisers the ability to reach a smaller segment of a station's community of license. This would benefit consumers, local advertisers, and broadcasters. Consumers would be subject to fewer advertisements not applicable to them. Local advertisers, including State and local political candidates and small businesses, would be able to reach the population they truly seek at significantly reduced cost.

- *Third*, like the situation with ATSC 3.0, deployment of this technology is voluntary. Thus, radio broadcasters would have the option of deploying this technology if they determined it was beneficial given their market and circumstances. As Chairman Pai said in his statement accompanying adoption of the ATSC 3.0 Order: *"[T]his is going to be a voluntary, market-driven transition. Following this Order, no broadcaster will be required to use the . . . standard. No consumer will be required to buy a new [receiver] or dongle for his or her current [receiver] that will allow them to receive . . . programming. The choice will be up to them. . . This is precisely the kind of technological innovation the FCC should champion."*[6] Each of those statements apply with equal force to the instant proceeding.

All of these benefits serve the Commission's longstanding goal of promoting localism, while at the same time letting the market decide -- and letting individual radio broadcasters decide -- whether deploying this technological capability makes sense for each particular community.

Since Geo Broadcast filed the Rulemaking Petition, the company and others in the radio industry have conducted numerous field studies of the ZoneCasting system that focus both on the self-interference issue as well as the consumer experience.[7] In addition to this technical review, the company also has researched and studied the benefits of this technology for the radio business and for consumers.[8] Members of the industry including Gates Air voiced their support for this rule change again last year,[9] in response to the comments of Shainis & Peltzman, Chartered seeking the same rule change though in the context of the Commission's *Media*

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[6] *Id.* at Statement of Chairman Ajit Pai.

[7] *See infra* at Section II.

[8] *See* BIA Advisory Services, "Opportunity Assessment for Local Radio Stations with Zoned Broadcast Coverage," 2018, attached hereto as Exhibit C ("BIA Report"); *see also* Edison Research, "What Does it Mean to be Local? Radio's Big New Opportunity," 2018, attached hereto as Exhibit D ("Edison Report").

[9] *See, e.g.*, Reply Comments of Anthem Broadcasting, LLC, MB Docket No. 17-105 (filed Aug. 4, 2017); Reply Comments of Gates Air Inc., MB Docket No. 17-105 (filed Aug. 4, 2017); Reply Comments of Nevada Radio LLC, MB Docket No. 17-105 (filed Aug. 4, 2017).

Modernization docket.[10] With this additional information submitted today, explained in detail below, Geo Broadcast respectfully asks that the Commission take all necessary steps so that it can amend the rule on booster stations and allow interested broadcasters to bring the benefits of this technology to their community.

II. Booster Rules and Localized Content

A. *The FM Booster Rule*

Geo Broadcast asks the Commission to amend 47 C.F.R. § 74.1231(i), which provides, in relevant part:

> An FM broadcast booster station is authorized to retransmit only the signals of its primary station which have been received directly through space and suitably amplified, or received by alternative signal delivery means including, but not limited to, satellite and terrestrial microwave facilities. The FM booster station shall not retransmit the signals of any other station nor make independent transmissions . . .

To understand the limitation this rule imposes, and what change would be required to permit the technology discussed above, it is important to understand how FM boosters are currently used.

FM boosters are part of a low power service on the FM broadcast band that complements primary FM service. The service was created in 1970 to allow FM stations to provide supplementary service to areas in which direct reception of radio service was unsatisfactory due to distance or intervening terrain barriers, such as mountains. Boosters should not be confused with translators. Translator stations simultaneously rebroadcast the signal of a primary AM or FM station on a different frequency. Booster stations are essentially "fill-in" facilities operating on the same frequency as the main station.[11] Translators may be owned by the licensee of the primary station they retransmit or by a third party; booster stations are always licensed to their primary station's licensee. The rule at issue only pertains to booster stations.

Importantly, Geo Broadcast is not seeking an amendment to any other rule. Because boosters utilize the same channel frequency assigned to the primary station, a broadcaster operating on an adjacent channel is in no way affected by a neighboring broadcaster who chooses to deploy ZoneCasting, since the neighboring broadcasters are already co-existing with

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[10] Comments of Shainis & Peltzman, Chartered, MB Docket No. 17-105 (filed July 3, 2017) ("S&P Comments").

[11] *See* 47 C.F.R. § 74.1201(f).

their current frequency assignments. Accordingly, the benefits of ZoneCasting can be achieved without any amendment to or waiver of the Commission's current interference regulations.

B. *Technology That Allows Insertion of Hyperlocal Content*

ZoneCasting uses a network of synchronous FM boosters to originate programming separately from the primary FM station. This technology uses lower-power and lower-height FM transmitters operating on the same frequency, and within the service contour, as the primary FM station transmitter.[12]

Booster stations are situated throughout a station's contour, and synchronized with the main transmitter. This means that when the boosters are simulcasting the main station's signal to their local area—or "zone"—they merely increase and improve the station's coverage.[13] But each booster also has the ability to broadcast its own localized information, different from that of the main transmitter and of other boosters. At specific times, under specific parameters, the booster clusters can broadcast hyper-localized programming to their respective zones.

The parameters for ZoneCasting were verified by simulations of transmitted FM signals at NPR Labs, and these simulation results were then evaluated by a large group of listeners in controlled subjective testing at Towson University. These parameters define the RF interference (C/I+N) ratios in both stereophonic and monophonic FM transmission, for fixed and mobile reception. Extensive network design work at NPR Labs was used to identify the power and height for the ZoneCasting boosters under a variety of primary station types and terrain conditions. By using appropriate parameters for each of main transmitter and each of the boosters, harmful interference within the target area of the zone can be effectively eliminated.

III. The Rulemaking Petition Presents No Technology Issues

A. ZoneCasting Will Not Cause Harmful Self-Interference

As explained in the attached Declaration by Bert Goldman, a consulting engineer to GeoBroadcast, the ZoneCasting technology that broadcasters could deploy does not raise any

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[12] Geo Broadcasting holds U.S. Patent #8,862,048 on this technology, "Equipment, System and Methodologies for Segmentation of Listening Area into Sub-Areas Enabling Delivery of Localized Auxiliary Information," as well as patents pending.

[13] GeoBroadcast has developed technology on this front as well. This system is called MaxxCasting, and is currently deployed in nine major markets across the country. *See* Declaration of Bertram S. Goldman at ¶¶ 6-7, attached hereto as Exhibit B ("Goldman Declaration").

technical concerns that should hold up Commission action.[14] First, because the rule change permits but does not require use of this technology, any broadcaster that voluntarily uses this technology will do so only if they are convinced it will not raise technical issues and is good for their business and their community. Second, field tests have shown that deployment of ZoneCasting does not result in harmful interference either between the primary station and boosters or among the booster cluster itself.[15] In addition to being designed to ensure this result, the technology is also calibrated so the zone-specific, localized content (*e.g.*, hyperlocal weather or advertising), is inserted at the appropriate time in primary station feed to provide a seamless experience without programmatic interference.

ZoneCasting is the product of nearly a decade of development and testing. Since its inception, Geo Broadcast has been working to advance booster technology. Geo Broadcast's efforts to perfect this technology and deliver benefits to radio broadcasters and consumers alike are particularly clear in the three tests of ZoneCasting that it has conducted with radio station partners across the country, pursuant to experimental authorizations from the Commission.[16] The first of these tests was in 2010, with KDUT in Randolph, Utah, an area with mountainous terrain. Based upon discussions with the Bureau staff following this initial test, the company next tested ZoneCasting in the flat terrain of Avon Park, Florida on station WWOJ. This test yielded importation information as to the effect of desired-to-undesired signal levels and how they affect signal quality.[17] In addition, these tests confirmed what was intuitively obvious: deployment of ZoneCasting technology does not cause interference to any other broadcaster.[18]

These two field tests prompted Geo Broadcast obtain better data to determine how booster signals propagate (both with and without separate programming) in order to reliably predict service and maximize signal quality. In order to obtain better data with respect to the former, the company developed new, more accurate propagation models.[19] With respect to the latter, as discussed below, the company enlisted NPR labs and Towson University to conduct listening tests, similar to the testing that HD radio proponents conducted prior to that technology's approval by the FCC.[20] These studies led to the development of objective and

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[14] *See generally* Goldman Declaration.

[15] *Id.* at ¶ 8.

[16] Reports on each of these three tests were hand-delivered to the Commission, and later publicly filed in the *Media Modernization* proceeding. *See* S&P Comments at Attachments A-C. Those submissions are incorporated herein by reference.

[17] Goldman Declaration at ¶ 10.

[18] *Id.* at ¶ 13.

[19] *Id.* at ¶ 11.

[20] *Id.*

verifiable interference targets for the design of booster systems—targets that previously did not exist.

Following this extensive development and refinement of the technology, Geo Broadcasting conducted a third ZoneCasting test with WIIL in Union Grove, Wisconsin, which broadcasts in an urban area.[21] While the boosters were replicating the main station's signal (*i.e.*, while they were in MaxxCasting mode), WIIL's signal quality in central Milwaukee dramatically improved. When ZoneCasting technology was implemented, the tests showed that the transition area between booster station zones can be minimized to only a tiny area within the entire metropolitan area, and for a very limited period of time, such that most listeners would never notice the transition area.[22] (In the 2016 test, the transition area was limited to one-tenth of one percent of WIIL's entire coverage area. Depending on the design, this could be further reduced.[23]) This very limited transition area for automobiles is crucial, as over half of all radio listeners only listen in their cars.[24]

The Commission is well aware, and took judicial notice of this fact in its recent ATSC 3.0 decision, that the first mission of broadcasters is to serve their community of license and as a result broadcasters will not engage or deploy any technology that impairs the ability of a broadcaster to reach their audience.[25] The powerful incentive that broadcasters have to meet the needs of their community is another source of assurance that the Commission can rely on to conclude that this rule change to allow broadcasters to deploy this booster technology will not cause harm to the listening public.

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[21] *Id.* at ¶ 13.

[22] *Id.*

[23] Which is to say that a broadcaster, could deploy more boosters and shrink any transition area even further (similar to how cellular systems operate). *Id.* at ¶ 8.

[24] *See* BIA Report at 9.

[25] *See, e.g.*, ATSC 3.0 R&O at ¶ 13 ("We give broadcasters discretion to select the primary stream for purposes of our local simulcasting requirement. Because broadcasters have a strong incentive to provide continuity of service to existing viewers, we believe they will elect to simulcast the programming stream that viewers expect to be able to receive . . . ."); *see also Broadcast Localism*, Notice of Inquiry, MB Docket No. 04-233 at ¶ 1 (July 1, 2004) ("Broadcasters, who are temporary trustees of the public's airwaves, must use the medium to serve the public interest, and the Commission has consistently interpreted this to mean that licensees must air programming that is responsive to the interests and needs of their community of license.").

B. No Impact on Other Broadcasters

As explained above, boosters operate on the same channel as the primary transmitter. Therefore, a station utilizing boosters to deploy ZoneCasting does not pose any additional interference risk to another station operating on a co-channel or an adjacent channel. This conclusion is borne out in the test results.[26] Therefore, adopting this rule change to allow the voluntary deployment of this technology raises no possible concerns for any broadcaster except the one deciding to deploy the technology. And as established above, the technology does not raise harmful self-interference issues for that broadcaster. Therefore, Geo Broadcast is not seeking any amendment or waiver of the Commission's existing interference rules.

Accordingly, the Commission can conclude that adopting the proposed rule change will not raise any significant technical or interference issues.

IV. **Benefits for Consumers**

The first beneficiary of this technology would be consumers, who will benefit both from hyper-localized produced content and hyper-localized advertising.

A. *Consumer Benefits of Hyper-Localized Produced Content*

ZoneCasting will permit a radio broadcast licensee to air different content to different areas of its community of license at the same time. For example, if a weather event or traffic incident were occurring in only one part of a station's community of license, it could interrupt its regularly-scheduled programming to make listeners in that area aware, but continue programming for other listeners. This would undoubtedly benefit the 90 percent of Americans ages 12 and over who listen to terrestrial radio in a given week (a figure that has changed little since 2009).[27] In fact, according to a study conducted by Edison Research in the summer of 2018 and attached to this submission, 72 percent of respondents indicated that they would listen to AM/FM radio *more* if the information and commercials were better targeted to their local area.[28]

Localized news and commercials are far from the only consumer benefit of ZoneCasting. The technology also permits stations to target emergency alert information, which can be critical in safety-of-life situations. Radio has always been a leader in this area, in part because radio

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[26] Goldman Declaration at ¶ 13.

[27] Audio and Podcasting Fact Sheet, Pew Research Center (July 12, 2018), http://www.journalism.org/fact-sheet/audio-and-podcasting/.

[28] *See* Edison Report at 15.

signals are available when electricity is not.[29] This hurricane season is no exception; in September, in his address to the 2018 Radio Show, Commissioner Michael O'Rielly praised the industry for its work helping the public prepare and cope with Hurricane Florence.[30] With ZoneCasting, the industry could do even more. Ken Lavorata, a 35-year veteran of the Chicago Police Department and former investigator at the Cook County State Attorney's Office, filed an *ex parte* letter in support of the Rulemaking Petition stating that in his time in law enforcement he "encountered many situations where the public would have benefited from the ability of radio stations to geographically target emergency alerts, weather issues and even traffic problems."[31]

The Commission has been an important force in ensuring that targeted emergency alerts are used by other types of media. The FCC has adopted narrower geo-targeting requirements for Wireless Emergency Alerts.[32] In authorizing television broadcasters' voluntary transition to ATSC 3.0, the FCC recognized that the new standard "will allow broadcasters to offer enhanced public safety capabilities, such as geo-targeting of emergency alerts to tailor information to particular communities . . ."[33] The Commission now has the opportunity to further enhance

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[29] The Rulemaking Petition quoted the FCC's 2008 Report on Broadcast Localism, in which the Commission emphasized the importance of radio's dissemination of emergency information to the public. This remains compelling today:

> One [commenter] described the important role local radio played in providing news updates and information on escape routes, survival types, and recovery strategies in New Orleans in the aftermath of Hurricane Katrina. Another stated that, with the help of local broadcasters, the State of Texas was able to turn a local tragedy into a triumph of technology and cooperation by creating the nation's first Amber Alert using EAS . . . . Another commenter stated that, without local broadcasters in North Carolina, there would be no Amber Alert system.

Broadcast Localism, Report and NPRM, MB Docket No. 04-233 at ¶ 83 (Jan. 24, 2008) ("Localism Report").

[30] "O'Rielly Talks Pirates, Media Ownership in Radio Show Appearance," Inside Radio (Sept. 28, 2018), http://www.insideradio.com/free/o-rielly-talks-pirates-media-ownership-in-radio-show-appearance/article_451500f8-c2f0-11e8-b237-8f22abfdfb54.html.

[31] Letter from Ken Lavorata to Marlene H. Dortch, Secretary, Federal Communications Commission, MB Docket No. 17-105 (filed Aug. 2, 2017).

[32] *Wireless Emergency Alerts*, Second R&O and Second Order on Recon., PS Docket Nos. 15-91, 15-94 at ¶¶ 5-6 (Jan. 31, 2018).

[33] ATSC 3.0 R&O at ¶ 1.

public safety capabilities by permitting radio broadcasters to voluntarily use ZoneCasting, and it is clear that doing so would be in the public interest, the standard that, as the Commission knows, is the "touchstone" of the Communications Act.[34]

B. *Consumer Benefits of Hyper-Localized Advertising*

The benefits of hyper-localized advertising are clear for both local businesses wanting to reach their actual audience and for broadcasters, and will be discussed in further detail below. But it is important to recognize how consumers also benefit from this ability of ZoneCasting. Edison Research found that, with respect to commercials in particular, 77 percent of respondents agreed that they would pay more attention to ads on the radio if they were for businesses or products in their local areas.[35]

This makes sense. Instead of an ad for a political candidate outside of the listener's district, who the candidate cannot vote for or against, a listener will hear an ad for a candidate in a race in which he or she can vote. Instead of an ad for a restaurant or car dealer two hours away, a listener will hear an ad for a new place in his or her neighborhood. In short, by modifying the rule at issue, the Commission can benefit a consumer's entire listening experience, including both produced content and advertising.

V. Benefits for Small Businesses and Localism

Hand-in-hand with these consumer benefits are benefits to small businesses and local political candidates that could place hyper-localized ads. Today, it may not make economic sense for a locally-owned restaurant or candidate for a State legislature to place an ad with a metropolitan radio station because, while the station's reach includes the restaurant's target geographic area or a candidate's district, it extends far enough beyond that target as to be economically inefficient. That is why restaurant chains, large car dealers, and Congressional candidates predominate radio ads. With ZoneCasting, that locally-owned restaurant or State legislature candidate would be able to reach a more targeted set of listeners that more closely aligns with their target audience, at a significantly lower cost than an ad covering the entire market. As the attached Edison Report shows, this feature makes the ad more valuable to both the entity purchasing the ad *and* the listeners. Today, many local independent businesses largely rely on mailers or mobile or online ads to advertise, because they are less costly and can be targeted in a way radio advertisements cannot. With ZoneCasting, these same businesses could target their ads to specific neighborhood areas, likely making a bigger impression. In short, ZoneCasting promotes localism.

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[34] *See, e.g.*, *National Broadcasting Co. v. U.S.*, 319 U.S. 190, 216 (1943).

[35] Edison Report at 14.

Localism—ensuring that broadcasters respond to the interests and needs of their communities of license—"has been a cornerstone of broadcast regulation for decades."[36] It underlies many of the Commission's rules, and has remained a value even as these rules have changed.[37] The Commission can further promote this important goal by permitting broadcasters to voluntarily deploy ZoneCasting.

VI. Benefits for Broadcasters

It is no secret that the radio broadcast industry faces challenging times financially. As the attached study from BIA explains, despite relatively steady listenership,[38] BIA's forecast model—which assumes no new, needle-moving innovations—projects a slow, continued decline in radio's revenue for the next five years.[39] BIA's study concludes that ZoneCasting could be that necessary innovation. It would put radio—the *only* mass media that cannot target its content—on the same playing field with other types of media, and give them the option of exploring new revenue streams by attracting new advertisers for whom it previously would not have made economic sense to buy ad for an entire community of license. The economic benefit to stations would be substantial.

Radio has many advantages. Its monthly users exceed TV, smartphone, desktop, multimedia device, and game console media. This type of usage and audience reach is critical for advertisers. However, increasingly marketers are placing increasing value on, and adjusting spending for, the ability to geo-target ad messaging.[40] BIA estimates that the total spend in just three categories of geo-targeted advertising—direct mail, out-of-home, and location targeted mobile—will increase by $10 billion over the next five years.[41] ZoneCasting would enable radio broadcasters to capture some of this otherwise inaccessible revenue, particularly those station licensees in the 38 radio markets that cross state lines and 64 radio markets serving multiple census-defined Core Based Statistical Areas ("CBSA") within their market geographies.[42]

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[36] Localism Report at ¶ 5.

[37] *See, e.g., 2014 Quadrennial Regulatory Review*, Order on Recon and NPRM, ¶¶ 8-48 (Nov. 20, 2017) (repealing the Newspaper/Broadcast Cross-Ownership Rule in part because it no longer promoted the goal of localism).

[38] Audio and Podcasting Fact Sheet, Pew Research Center (July 12, 2018), http://www.journalism.org/fact-sheet/audio-and-podcasting/.

[39] *See* BIA Report at 6.

[40] *Id.* at 10.

[41] *Id.* at 11.

[42] *Id.*

BIA constructed a model to evaluate the potential impact of zoned advertising on the markets noted above. Noting that its model might be conservative, as it only includes the multi-state markets, multi-CBSA markets, and other top-25 markets, the BIA projects annual industry revenues in those markets could increase between 3 percent and 11 percent, with the wide range dependent on a variety of assumptions, such as the percentage of spots that are geo-targeted.[43] In short, ZoneCasting may have a significant impact on the financial health of radio stations and could help stem the tide of declining revenue being experienced by the radio industry.

Furthermore, allowing radio broadcasters to use ZoneCasting technology will put them in line with what their traditional competitors, television broadcasters and MVPDs, can do.[44] Radio is the only mass medium that cannot geo-target content. For example, MVPDs can provide services to zoned coverage areas inside the larger television market, allowing them to offer more attractive pricing to advertisers with smaller budgets or allow large budget advertisers to deliver different ads to different coverage zones. ATSC 3.0 will permit television broadcasters to catch up and provide targeted advertising. Additionally, television broadcast licensees may contract with MVPDs carrying the licensee's signal to permit MVPDs to insert their own advertisements into the station's signal (commonly called a "split signal" agreement). This can be a source of revenue for a TV station licensee, and permits an MVPD to deliver what it considers to be more relevant advertising. Now that the technology exists to grant radio broadcasters an analogous ability, it should be permitted without delay.

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[43] *Id.* at 16-17.

[44] *See id.* at 3.

In light of the numerous benefits ZoneCasting will bring to consumers, local communities, and broadcasters, we ask the Commission to issue a Public Notice asking for comments to refresh the record, so that it will be in a position to amend the one rule currently blocking this broadcasters from deploying this technology. Please direct any questions to the undersigned.

Respectfully submitted,

_____/s/_____
Gerard J. Waldron
Counsel for Geo Broadcast Solutions, LLC

Attachments:
Exhibit A: *Ex Parte* Presentation
Exhibit B: Goldman Declaration
Exhibit C: BIA Report
Exhibit D: Edison Report

cc: Meeting attendees

EXHIBIT A

ZoneCasting™
Introducing Geo-Targeting for Radio

Geo Broadcast Solutions
November 2018

Who We Are

- Founded in 2011 to innovate and bring to market technologies that help radio broadcasters maximize their signal and grow revenues
- Two technologies:
  - MaxxCasting – currently deployed in nine major markets across the country
  - ZoneCasting – what we're here to talk about today

Where We Are

- Radio is the only mass medium without the ability to geo-target content
- Geo-targeted content is increasingly valued by consumers and advertisers
- For nearly a decade, Geo Broadcast Solutions has been working to develop a technical solution

Where We Can Go

- One simple rule change: to permit booster radio stations to originate their own programming, separate from the main station
- *No changes or waivers to FCC's interference rules required*
- Like ATSC 3.0 for radio:
  - Voluntary deployment
  - Hyper-localized content to different areas of station's community of license
    - Weather
    - News
    - Alternate language programming
    - Advertising
    - Emergency alerts

Table of Contents

Booster Basics

Booster Basics

- Operate on the same frequency as the main transmitter (*so issue is self-interference, not interference with another broadcaster*)
- "Fill-in" facilities -- supplement a station's service in hard-to-reach areas, improving signal quality
- Primary contour of booster must be inside the primary contour of the main transmitter
- Secondary status
- Always licensed to same licensee as primary station
- *Currently are only authorized to retransmit the primary station signal*

Booster Basics

Boosters can operate with no harmful self-interference

Synchronization requirements:

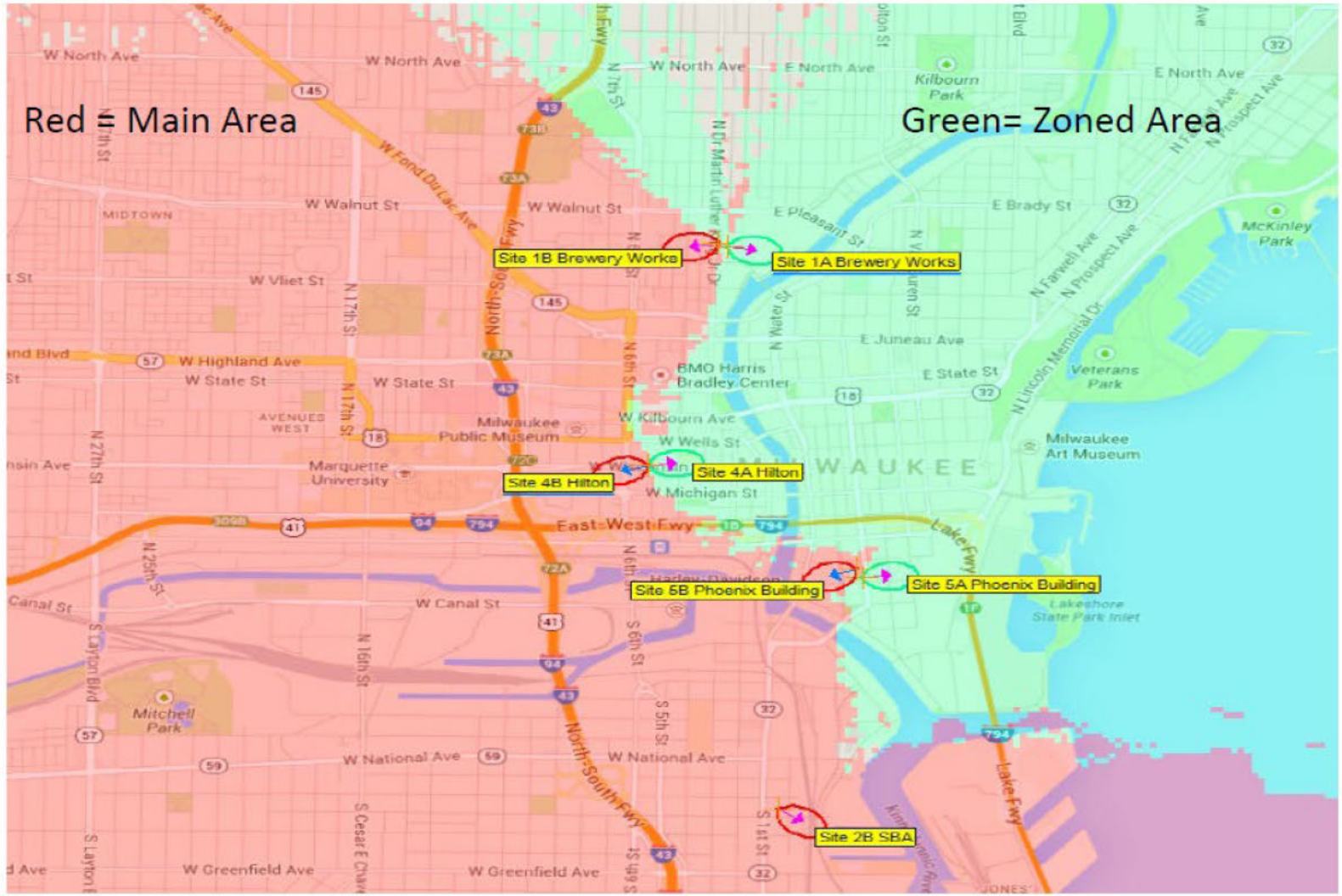
- *Carrier & pilot*: Main/booster must be GPS locked.
- *Pilot phase*: Must be matched in FM exciter based upon delay
- *Modulation*: Must match within 0.25dB Now available AES 192 - digital composite audio which inherently matches phase as well.
- *Timing*: *Propagation* delay from the main to boosters must be synchronized and must be reliable & stable to within ≤3μS
- *Antenna*: Must be chosen to reduce delay spread for timing to minimize interference
- *HD SFN*: Unique issues implementing boosters with HD primary station. HD system delay must be stable, deterministic

How ZoneCasting Works

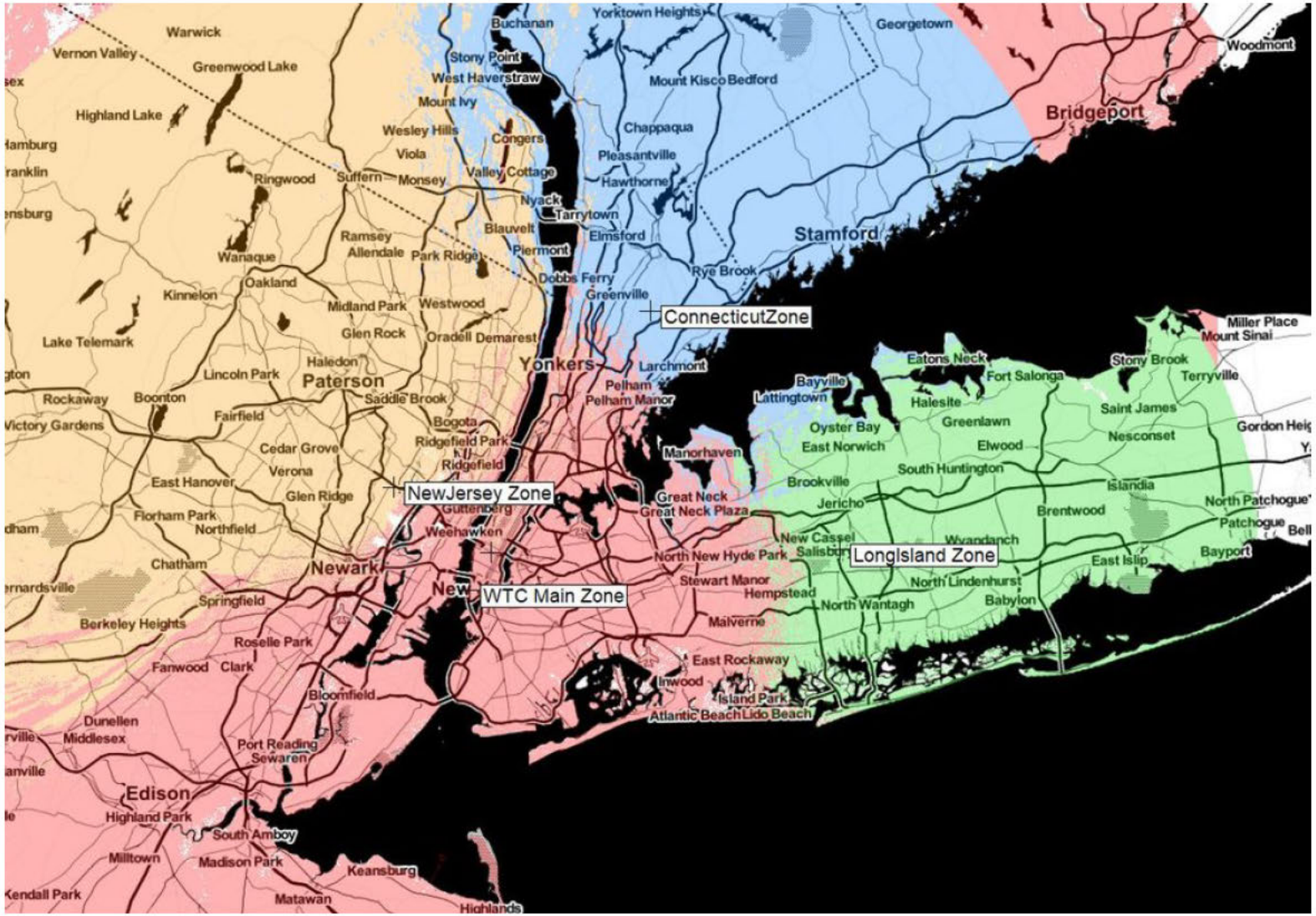
How ZoneCasting Works

- Network of synchronous boosters originate programming separately from the primary station
- When boosters are simulcasting the main station's signal to their zone, they merely improve station's coverage
  - MaxxCasting – currently deployed in nine major markets across the country
- When boosters broadcast their own programming, they allow for geo-targeted content
  - MaxxCasting + second set of nodes using opposed log-periodic antennas

One Market Contains Many Zones



One Market Contains Many Zones



No Harmful Interference

No Harmful Interference

- Voluntary deployment
  - First mission of broadcasters is to serve community of license, will not deploy any technology that impairs their ability to reach their audience (ATSC 3.0)
- Three field tests (pursuant to experimental authorizations)
  - 2010: KDUT (Randolph, UT)
  - 2011: WWOJ (Avon Park, FL)
  - 2016: WIIL (Union Grove, WI)
- Extensive lab tests
  - NPR Labs
  - Towson University

No Harmful Interference

- ZoneCasting technology is calibrated so zone-specific, localized content is inserted at the appropriate time in primary station feed to provide a seamless experience
- Transition area between zones can be minimized to a very limited distance and time, making listener tune-out highly unlikely

Edison Research Survey: Benefits for Consumers

GEO BROADCAST SOLUTIONS

edison research

Survey of 1051 Americans

Ages 18 and older in the top 100 markets

Conducted in Summer 2018

All respondents listen to "over-the-air" AM/FM radio at least once/month

Sex, age, ethnicity, and geography weighted to match national population

How much do you agree/disagree...

"You would pay more attention to ads on the radio if they were for business or products in your local area."

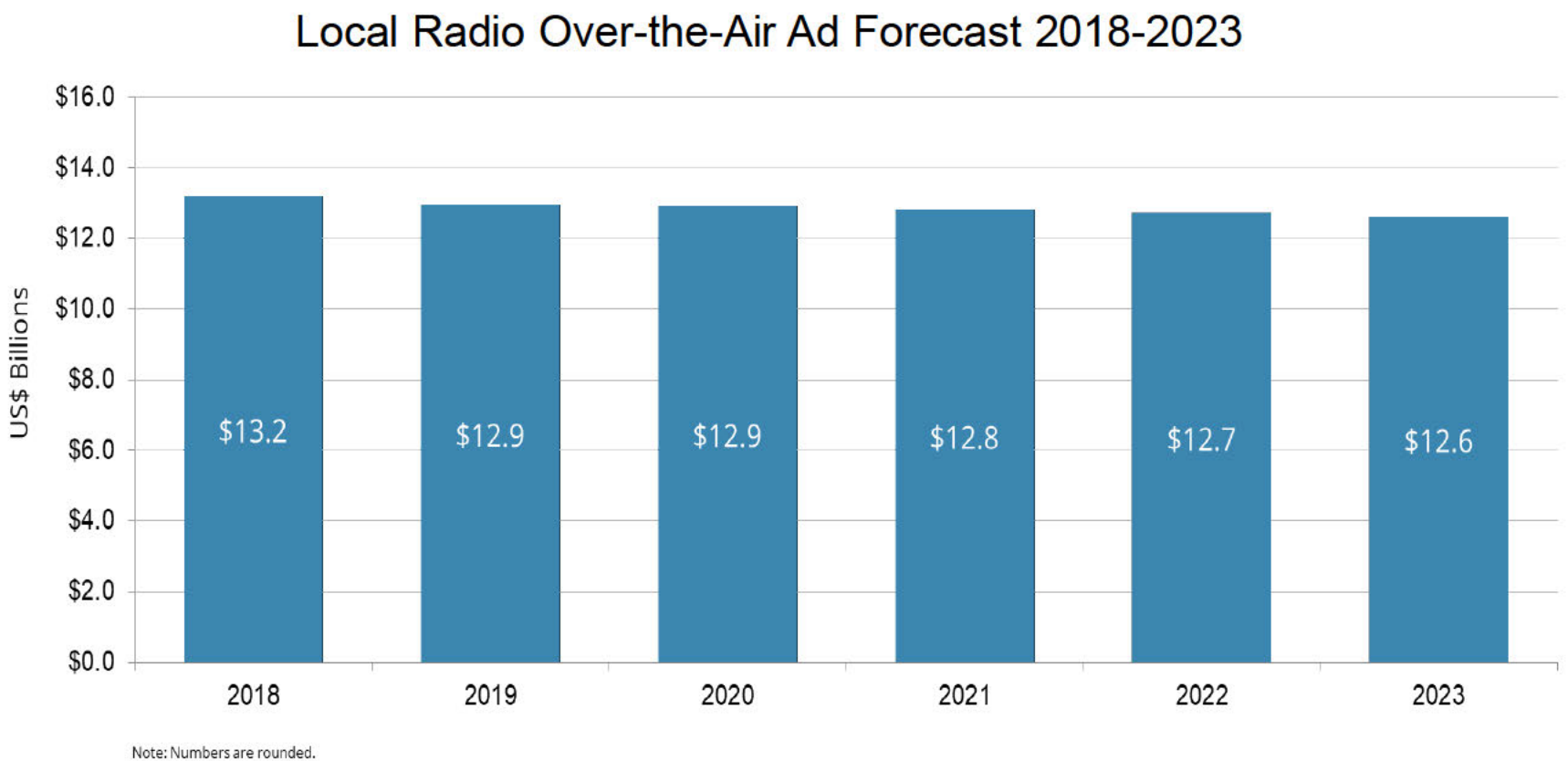
Strongly Agree/Agree:

77%


How much do you agree/disagree...
"You would listen to AM/FM radio more if the information/ commercials were better targeted to your local area."
Strongly Agree/Agree:
72%
GEO BROADCAST SOLUTIONS
edison research

BIA Advisory Services: Benefits for Broadcasters

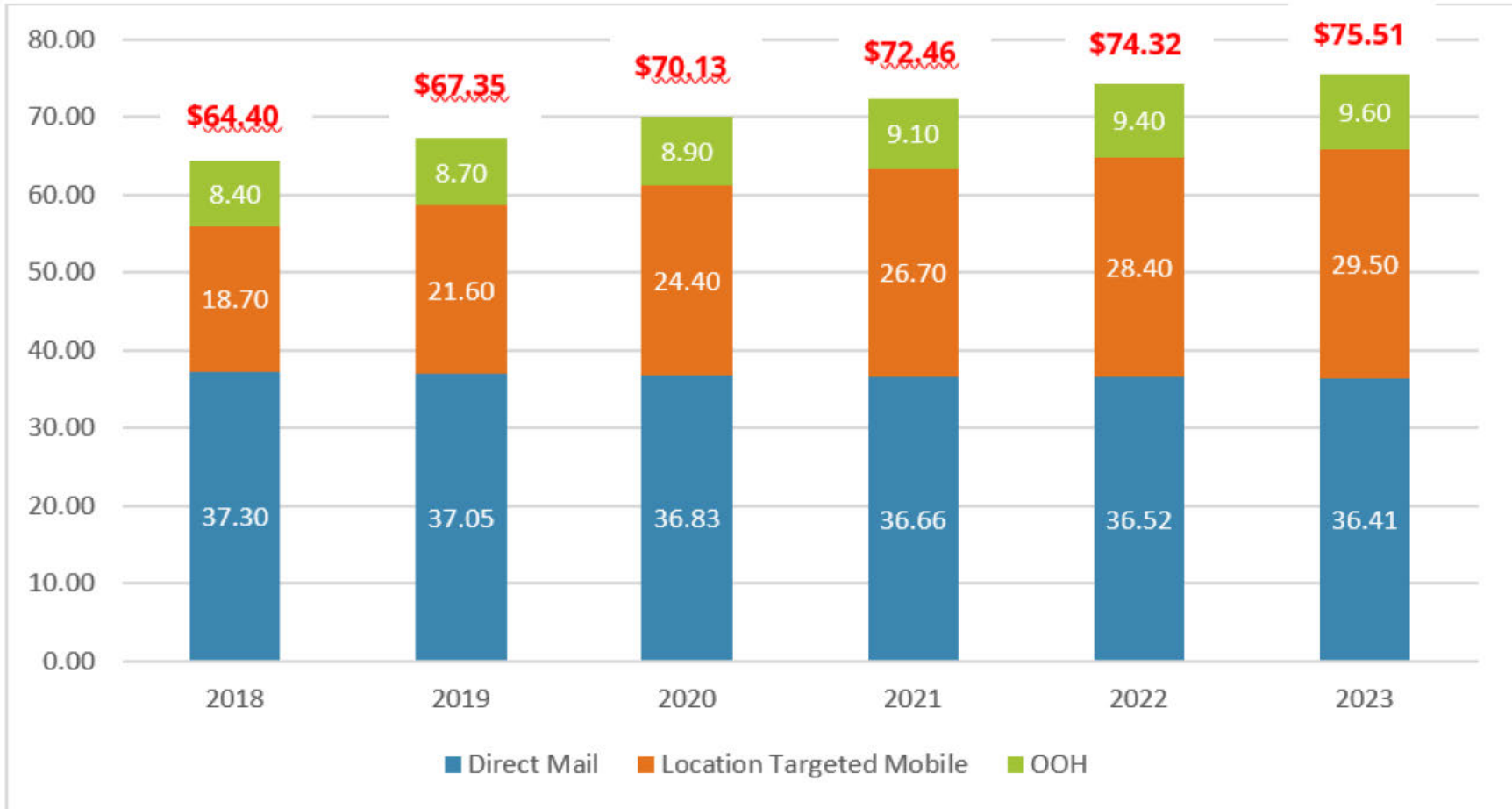
Current State of the Local Broadcast Radio Industry



Note: Numbers are rounded.

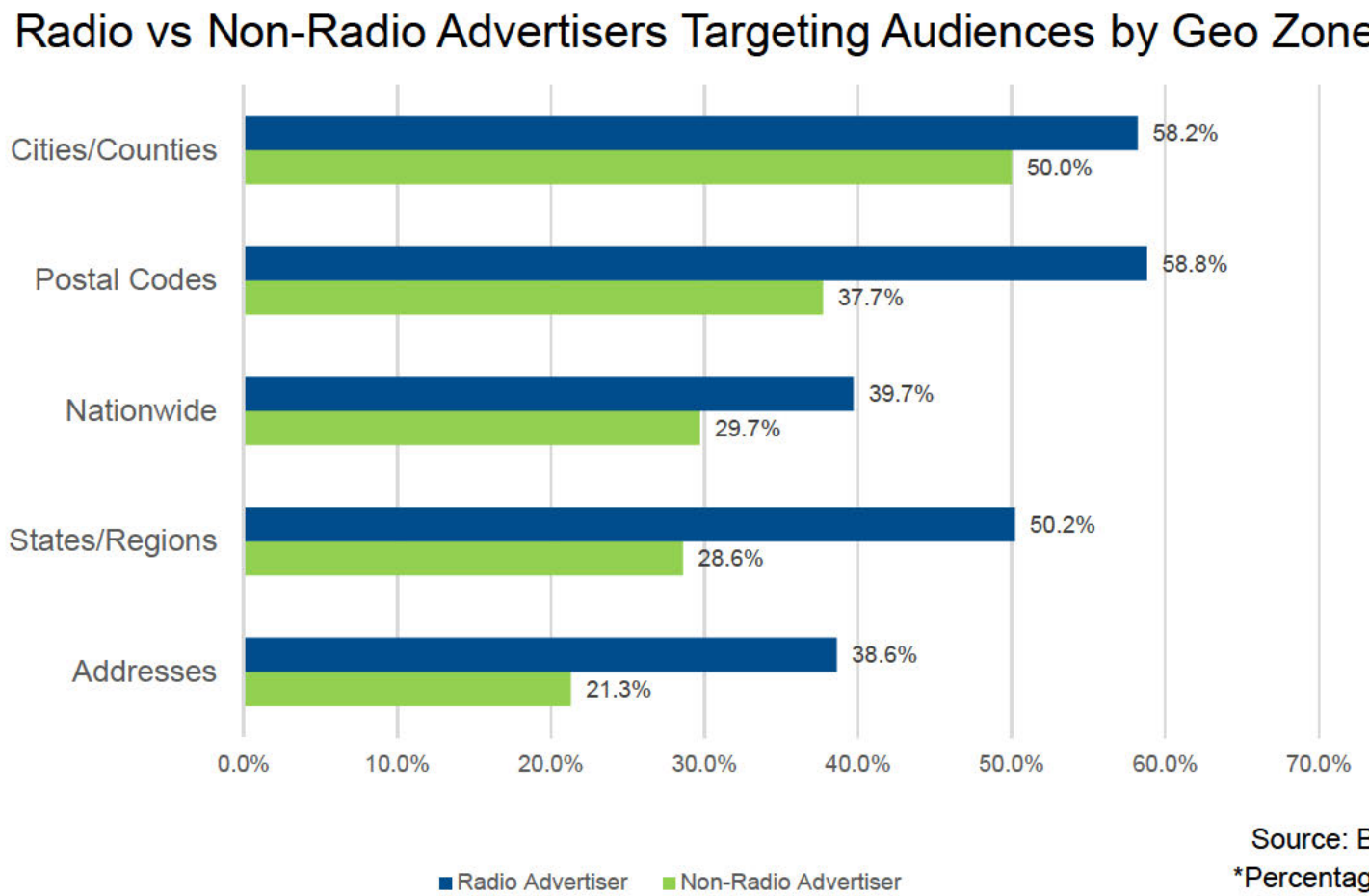
Source: BIA Advisory Services, November 2018

Growth of Location-Based Marketing



Source: BIA Advisory Services, November 2018

More than Half of Local Radio's Advertisers Want to Geo-target Their Advertising



Source: BIA Advisory Services, November 2018
*Percentage of advertisers targeting audiences at different geographic levels

Many Radio Markets Cover Multiple Jurisdictions

- Many existing radio markets (as defined by Nielsen Audio) cover multiple jurisdictions
- With a zoned broadcasting system, local radio stations can provide access to audiences that advertisers want to reach in these distinct jurisdictions.
- 38 Nielsen Audio defined radio markets that cross state boundaries in a significant manner (at least 10% of the total radio market population residing in multiple states)

Washington, DC Radio Market Coverage Area by State Population Served

State of Residence	% of Washington, DC Radio Market Population
Virginia	45.8%
Maryland	42.4%
District of Columbia	11.7%

Source: BIA Advisory Services, November 2018

BIA Model: Significant Revenue Growth

BIA Model for Industry Impact of Zoned Radio Advertising

Model Parameters	Example 1	Example 2	Example 3
2017 Total Over-the-Air Adv. Revs. (000s)	$6,603,425	$6,603,425	$6,603,425
% of Stations Zone Advertising in Multi-State/Multi CBSA Markets	20%	30%	35%
% of Market Revs. Attributable to the Zone Advertising Stations	40%	60%	70%
% of Stations Zone Advertising in Other Top 25 Ranked Markets	25%	35%	40%
% of Market Revs. Attributable to the Zone Advertising Stations in Other Top 25 Ranked Markets	50%	70%	80%
% of Spots that are Zone Advertised	20%	25%	30%
% Premium for Zone Advertising	30%	40%	50%
Additional Revenue (000s)	$181,604	$434,743	$751,165.

Source: BIA Advisory Services, November 2018

Questions?

EXHIBIT B

DECLARATION OF BERTRAM S. GOLDMAN

1. My name is Bertram S. Goldman. I am the President of Goldman Engineering Management, Inc. I have over 40 years of experience in radio engineering. Over the course of my career, I have acquired substantial expertise in developing and facilitating improvements to radio stations, as well as overseeing construction and engineering operations.

2. Prior to founding Goldman Engineering, I served as Corporate Vice President of Engineering for several broadcast companies, including ABC/Disney Radio Division, Nationwide Communications, Patterson Broadcasting, and Shamrock Broadcasting. In my most recent group engineering position at ABC, I provided engineering oversight for over 100 ABC O&O, ESPN, and Radio Disney stations as well as the ABC Radio Network.

3. During my career, I have engineered numerous station improvement projects, including stations in more than half of the top 25 radio markets.

4. I earned a B.A. in Broadcasting and Management from the University of Maryland, College Park. I am a member of the Institute of Electrical and Electronic Engineers ("IEEE") and the Society of Broadcast Engineers ("SBE"), and an associate member of the Association of Federal Communications Consulting Engineers ("AFCCE").

5. I have significant and specific experience in the field of FM booster technology. I have written and presented papers as far back as 1988 about booster technology at National Association of Broadcasters conferences.[1] Based on my extensive knowledge of radio engineering issues, my analysis of the underlying booster technology, and my review of the tests

[1] Goldman, Bert and D. Gooch, "Designing and Modeling High Power FM Boosters," 1988 NAB Engineering Conference Proceedings.

that have been conducted on this technology, it is my opinion that the ZoneCasting™ system proposed by Geo Broadcast Solutions, LLC ("Geo Broadcast") can be launched without causing harmful interference, either to the station launching the system (*i.e.*, self-interference), or to other broadcast licensees.

6. Before turning to a discussion of ZoneCasting, it is important to first discuss a related technology, MaxxCasting, that forms the basis for ZoneCasting. Since 2015, I have been working with Geo Broadcast to develop multiple node (multiple transmitter) booster systems known as MaxxCasting systems. MaxxCasting systems use multiple boosters synchronized both with the main transmitter and with each other to produce nearly seamless transitions between node areas. MaxxCasting improves coverage beyond what would be possible with only the main transmitter by filling in low signal areas within an FM station's protected service contour. MaxxCasting has now been successfully deployed in Boston, New York, West Virginia, Tampa, Miami, Milwaukee, Chicago, Seattle, and Los Angeles, and is expanding rapidly. Stations that have deployed MaxxCasting report vastly improved Nielsen PPM decoding.

7. MaxxCasting is able to achieve interference-free signal improvement due to four techniques Geo Broadcast has employed, which essentially "trick" the receiver into thinking that it is hearing one station instead of two or more (resulting in distortion and interference). These techniques are:

A. Carrier synchronization, now possible by using GPS-trained oscillators;

B. Pilot phase synchronization, also possible using GPS;

C. The use of small cells with highly directional antennas to keep the real-time FM waveforms at the receiver to within two microseconds. While the technology for MaxxCasting on analog stations has been available for several years, The

technology to so precisely control the timing of the audio waveform for both analog stations and stations operating with HD Radio has only been perfected within the last year. Accurate RF modeling and prediction, critical in optimizing performance, is accomplished with powerful software tools developed by the wireless industry for cellular communications. This allows Geo Broadcast to precisely tailor parameters to maximize coverage and minimize interference.

D. Maintaining the audio modulation of the main and booster FM carriers to identical waveforms with less than a 0.1 dB difference between the main transmitter and all nodes. This is also a recent development, made possible by AES digital transmission and synchronization and high-speed data circuits.

8. ZoneCasting is based on MaxxCasting technology. The difference is that during limited times, ZoneCasting broadcasts localized information only on specific booster nodes, meaning that this information—which could be advertising, programming, or emergency alerts—only reaches the specific nodes' local area, or "zone." Due to the differing content, since identical waveforms cannot be generated, ZoneCasting makes use of the above techniques slightly differently. Techniques A and B remain synchronized. The antennas in technique C still tightly control where the different programming goes and tightly roll off the signal at the edge of coverage to keep any self-interference minimized. To minimize the transition zone between the main station's programming and the separate zoned location's programming, a second antenna is added to each node's antenna and pointed 180 degrees away from that of the first antenna, transmitting a low power signal matching the main station's programming. By doing this, a listener traveling between zones experiences only a very small area where the audio transition is noticeable. In the most recent testing, due primarily to cost constraints, the transition area was

limited to one tenth of one percent of the station's coverage area. Depending on design, this could be further reduced. In contrast, many currently-licensed boosters not using the techniques enumerated in this declaration to mitigate interference have interference areas that take up 20 percent or more of the primary station's coverage area, even though the boosters are merely retransmitting the primary station's signal. Finally, with respect to technique D (maintaining modulation within 0.1 dB), based on our tests, we have found that maintaining modulation peaks as close to identical as possible (even though the nodes are broadcasting different content) further helps reduce interference between zones.

9. ZoneCasting is the product of nearly ten years of development and testing. Since its inception, Geo Broadcast has significantly contributed to the technology and usefulness of on-channel boosters, both for same-content and differing content operations. The first ZoneCasting proof of concept was conducted pursuant to an FCC experimental authorization in Salt Lake City, Utah on KDUT in 2010. Geo Broadcast used an existing array of boosters with no changes other than feeding different program content to different booster nodes. Stationary measurements were taken in many locations in and around Salt Lake City to determine the efficacy of the ZoneCasting concept. Due to natural terrain blockage, relatively good performance was experienced and documented; however, no mobile testing was conducted.

10. Based upon comments from FCC staff following the initial 2010 test, Geo Broadcast conducted its second test of ZoneCasting under an FCC experimental authorization in flat terrain in Sebring, Florida on station WWOJ. In this test, custom log-periodic antennas were designed and set up in strategic locations to better define the zoned broadcast areas. Automated quality testing was implemented using an Audemat MC3 FM modulation analyzer. Quality measurements were recorded using a five-point scale and comparisons were made with and

without the zoned operation at the same fixed locations. This test gave Geo Broadcast important information as to the effect of D/U (Desired to Undesired) signal levels and how they affect quality.

11. After the above two field tests, Geo Broadcast concluded that better data was necessary to determine how booster signals propagate (both with and without separate programming) so that reliable prediction of service could be measured and signal quality could be maximized. This led to the introduction of new tools to predict propagation, such as the ATDI ICS Telecom software. Much work was done to develop extremely accurate propagation modeling tuned with signal measurements from the field. Further, it was determined that there was little available data regarding the effect of D/U ratios and other factors (as noted above) on reception quality and what level of interference would typically be tolerated by listeners. In 2013, Geo contracted NPR labs and Dr. Ellyn Sheffield of Towson University to conduct subjective listening tests in much the same way that HD Radio proponents tested that technology prior to approval of HD Radio by the FCC. Lab simulations of MaxxCasting and ZoneCasting configurations were set up and 19,000 audio samples were evaluated by over eighty listeners. Design standards for acceptable interference thresholds were developed and for the first time provided objective and verifiable interference targets which could be used in the design of booster systems, both with the same and different program content.

12. Following the extensive testing and development that took place between the initial 2011 and 2012 field tests and the most recent field test—conducted in 2016—Geo Broadcast developed new, significantly improved design criteria for booster systems. Geo Broadcast successfully implemented MaxxCasting booster systems with a high degree of quality and repeatability, that could work consistently in all terrain. Based upon the work done in

MaxxCasting design, the ZoneCasting design criteria was modified to add a second antenna back-to-back with the zoned antenna which carried the main programming. This modification allows for a very fast transition in a mobile environment and significantly improves performance of the ZoneCasting system.

13. With the success of the MaxxCasting design, Geo Broadcast and WIIL in Union Grove, Wisconsin tested the new ZoneCasting design pursuant to an FCC experimental authorization in the fall of 2016. In this test, four ZoneCasting nodes were set up in central Milwaukee, Wisconsin. During periods where the zones replicated the main audio, the system operated in MaxxCasting mode. In MaxxCasting mode, WIIL's signal quality in central Milwaukee drastically improved. When the ZoneCasting process was implemented, field tests showed that the transition from main to zone in a mobile environment could be reduced to such a short period that it is believed consumer tune-out would be unlikely. WIIL filed the full report with the FCC in February 2017. The results are impressive, and demonstrate proving that the deployment of ZoneCasting did not cause harmful interference to other broadcast facilities, and that self-interference experienced by listeners was limited to only a few city blocks, for a very limited period of time.

14. In conclusion, in my professional opinion the FCC requirement found in Section 74.1231(i) of the Commission's rules that requires booster programming for full power FM stations to be identical to the main station is no longer necessary to guard against harmful interference either to (i) other broadcasters in the market or (ii) to consumers listening to the main station. Due to advances in synchronization technology and RF modeling, it is now possible for synchronized boosters to not only improve coverage in shadowed areas, but also

within a station's coverage area, allow specialized targeted information to be delivered with no harmful interference to listeners in the small controlled transition areas.

/s/
Bertram S. Goldman
November 29, 2018

EXHIBIT C

Opportunity Assessment for Local Radio Stations with Zoned Broadcast Coverage*

November 20, 2018

Prepared for GeoBroadcast Solutions

*Executive Version

CONTENTS

Tables

Figures

EXECUTIVE SUMMARY

We assess the opportunities for local radio stations to provide zoned broadcasting coverage areas that would allow them to provide geofenced advertising, programming, and other content that is more relevant for their markets. Local radio stations currently do not have the authorization to provide zoned coverage areas inside their overall FCC authorized signal contours. There are initiatives underway to obtain zoned authorization for local radio stations. Unless this authorization is obtained, local radio will be the only local electronic media channel without the ability to target consumers geographically. This adds to the competitive challenges of a media segment in decline.

Location intelligence and being able to target consumers geographically has become very important to marketers seeking new ways to engage and impact audiences. According to *Forbes*, The analytics provided by geofencing are invaluable for understanding and directing your customers. Knowing their shopping habits, and their habits throughout life otherwise, gives you the opportunity to reach out to them in meaningful ways. At the same time, it helps you build brand awareness and retain customer loyalty.

The top 25 markets are quite large and might be ripe for zone advertising in different regions of the market. In addition, local radio stations in 38 radio markets cross state lines and 64 radio markets serve multiple CBSAs within their market geographies. As important as radio stations are to their local markets, they are often challenged to serve diverse geographic communities of interest inside their main coverage zone with those signals crossing state lines, major city centers, suburban communities and other socioeconomic centers. Since other media can provide geotargeted or geofenced zoned services, radio stations are at a disadvantage in serving audiences and advertisers.

The market certainly reveals strong and growing demand for location-based ad targeting for delivering ads to specific locations inside the full local market coverage area. Zone-based advertising is a mature practice built into advertising workflows and systems.

Zoned broadcast coverage areas for local radio stations would help create:

- Coverage areas for geographic zones inside markets crossing state or city center boundaries.
- Zoned radio broadcasting provide access for smaller advertisers currently priced out of radio.
- New revenue opportunities for local radio broadcasters desperately seeking growth.
- New programming and service models for audiences.
- Additional geotargeted services, e.g., for public safety, alerts and warnings, PSAs, weather and traffic.

BIA concludes local radio needs to develop more innovative and competitive responses for audiences and advertisers to achieve significant growth. We don't see local radio's online activities alone supporting these objectives. However, by offering a fundamentally new product such as zoned advertising, radio can be better positioned to compete with MVPDs, newspapers, direct mail and eventually ATSC 3.0 television stations.

INTRODUCTION AND OVERVIEW

One prominent recent trend in the local media mix is the transition from marketers "buying local media" based on broad gender and age categories to their new trend of "buying audiences" based on deep audience segmentation criteria, including geotargeting.

Online and particularly digital media have advanced capabilities for geotargeting audiences in local media markets, and that in part, explains their fast growth. Beyond digital media, MVPDs (i.e., cable, satellite, telco system operators), and broadcast television stations have or soon will have the technology to meet the growing demand for geofenced ad zones.

Local radio stations, important as they are in the media mix, do not have the ability to provide zoned coverage areas inside their overall FCC authorized signal contours.

In this report, we assess the opportunities for local radio stations providing zoned broadcasting coverage areas that would allow them to provide periodic geofenced advertising, news programming, alerts and warnings to increase the relevance and impact of these services for their audiences and advertisers.

Overall, BIA concludes that local radio stations need to develop more innovative and competitive responses for local market audiences and advertisers to achieve significant growth. We don't see local radio's online activities alone supporting these objectives. However, by offering a fundamentally new product such as zoned advertising, radio can be better positioned to compete with MVPDs, newspapers, direct mail and eventually ATSC 3.0 television stations.

RADIO'S ROLE IN THE LOCAL MEDIA MIX

Local Radio is Foundational in the Local Media Mix

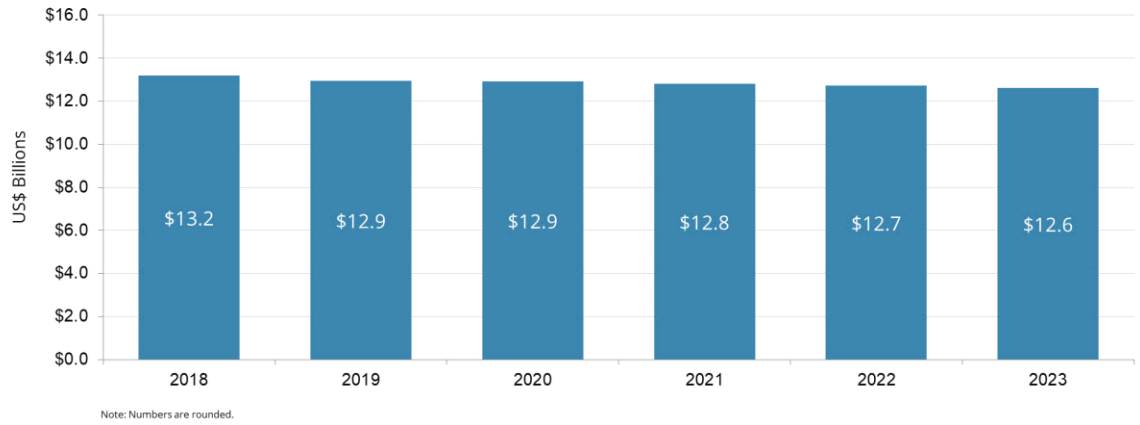
Radio has long enjoyed a foundational and durable role in the in the local market media mix. Radio reaches more people on a weekly basis than any other medium. Local radio is a major and relied upon source of entertainment, news, information, and advertising servicing the needs of listeners, businesses and public institutions. Local radio stations are a fixture in the lives of local audiences by helping them stay in touch with their communities.

Indeed, Nielsen concludes that with its 270 million weekly listeners, "Broadcast radio specifically continues to profoundly enrich the lives of listeners and create value for advertisers. Each week, more Americans tune into AM/FM radio (93%) than watch television, or use smartphones, tablets or computers."[1]

Ad Forecast for Local Radio

In BIA's October 2018 updated forecast for ad spending targeting local audiences, we're estimating total spend on over-the-air radio will continue a steady decline. In 2018, we're forecasting the year will end up with $13.2 billion in broadcast revenue. Radio's revenue continues a slow decline through 2023.

Figure 1. Local Radio Over-the-Air Ad Forecast 2018-2023



Source: BIA Advisory Services, November 2018

Digital Changes Audience and Advertiser Expectations of Local Media

Ad-supported streaming services like Pandora that target local advertising are on the rise. In part, this is due to the ability of streaming audio services to offer geotargeting to advertisers. According to the *New York Times*, "Pandora's pitch to advertisers is that its technology can cater to consumers with far greater precision than radio — it can pinpoint listeners by age and sex, ZIP code or even musical taste — and that as it grows, Pandora will effectively be the top station in many cities."[2]

Serving Diverse Geographic Communities of Interest with Zoned Coverage

Most people live, shop, and work locally, within a geographic zone that has a typical radius of 10-20 miles. Advertisers know this and have a vested interest in being more relevant to their consumers by using geographic context in their messaging. Each of these local zones often has their own character reflecting specific diversities of demographics, employers, commercial and retail operations, cultural, political and government influences.

As important as radio stations are to their local markets, they are often challenged to serve diverse geographic communities of interest inside their main coverage zone with those signals crossing state lines, major city centers, suburban communities and other socioeconomic centers. Since other media can provide geotargeted or geofenced zoned services, this puts local radio stations at a disadvantage in serving audiences and advertisers.

Soon radio stations will be the only electronic mass media channel that is unable to serve local geographically zoned coverage areas.

MARKET READINESS FOR RADIO OFFERING ZONED ADVERTISING

The market certainly reveals strong and growing demand for location-based ad targeting for delivering ads to specific locations inside the full local market coverage area. Zone-based advertising is a mature practice built into advertising workflows and systems.

Location-based advertising platforms

Location targeting allows a brand to show it knows something about the consumer that matters. A New York radio station delivering Long Island auto dealer ads to a New Jersey listener is much less impactful than delivering those ads to a Long Island listener.

Advertisers seeking to use ad geotargeting in their marketing mix have a limited set of channels to choose from. The biggest channel, by far, is direct mail and the fastest growing is mobile. The next biggest channel is out-of-home advertising.

Newspapers sell zoned advertising as well. In the electronic media realm, geotargeting has grown most in mobile ad channels (i.e., mobile web sites and mobile apps). Local MVPDs provide zoned advertising distribution in their own coverage areas and through interconnects.

Local TV and radio stations do not have an over-the-air zoned ad coverage product, though with ATSC 3.0 this will change for TV. Streaming TV services offer geotargeting, and this is a rising part of the market, e.g., Hulu, YouTube.

Zoned broadcast coverage areas for local radio stations would help create:

- Coverage areas tailored to specific geographic zones inside larger markets that cross state or city center boundaries.
- Zoned radio broadcast transmissions provide new voices for smaller advertisers currently priced out of radio.
- New revenue opportunities for local radio broadcasters seeking growth.
- New programming and service models for audiences. This can include zoned news, weather, traffic feeds. Public alerts and warnings and PSA also can be sent to the most relevant zones.
- Additional geotargeted services for public safety, and other use cases.

Reaching the Geofenced In-Car Audience

Local radio station zoned coverage areas would be beneficial both for targeting fixed location listeners, e.g., home, work, school, but also listeners in cars. As drivers pass through coverage zones, radio stations can provide in-zone locally relevant programming and advertising.

The in-car audience is crucial to local radio stations, as up to two-thirds of all radio listening for some audience segments is car-based, according to Edison Research. Overall, 54 percent of radio listeners, "listen to radio only in the car." For a core audience segment that advertisers want to reach, those 35-54 years old, in-car only listening rises to 58 percent. And for younger audience segment (13-34 years old), nearly two-thirds (62 percent) listen only in-car.

In-car audiences are interesting for local radio stations because car "head units" in more recent models feature video displays including RDS and HD Radio visual text and graphics. This creates essentially a new advertising channel enabling more inventory that radio stations can offer to advertisers. If this visual advertising can be geofenced, it becomes more impactful to audiences and thus more valuable to advertisers as we'll highlight below.

Using zoned coverage areas, local radio stations could display auto dealer information most relevant to listeners in that zone, rather than the same information to all listeners across the entire coverage area. Adding this geotargeting dimension increases the impact of such advertising.

In Figure 2, we show an example of how HD Radio technology supports data provided to HD radio receivers' digital screens. In this example, it's a case of providing a geofenced ad for not just an automotive brand but for a local dealer relative to the car's current location. When adding the local auto dealer information to the radio's display unit, listener recall increased from 4 percent to 26 percent, according to a study by Nielsen.[3]

Figure 2. Example of HD Radio Display with Geofenced Advertising

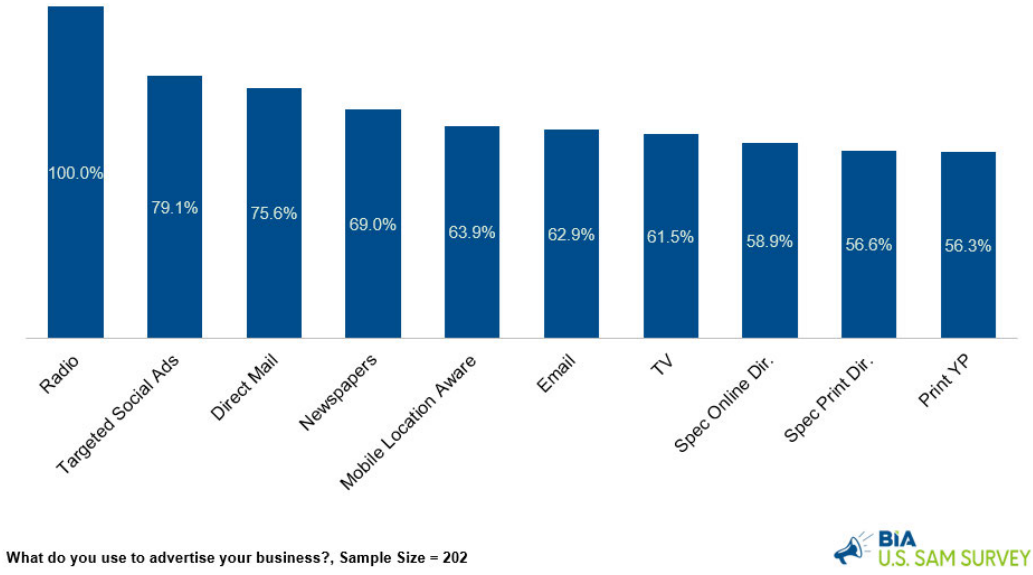
Source: RAB, Radio Matters blog, April 30, 2018.

Radio Advertisers' Use of Other Location-Targeted Ad Media

BIA's annual Survey of Advertising and Marketing (SAM) looks at the advertising platforms used by all types of businesses to target local audiences.

In Figure 3, we show what other ad channels are used by businesses who advertise on radio. It's interesting to note that radio advertisers most rely on advertising media that provide some level of geotargeting, including social, direct mail, newspapers, and mobile. Radio advertisers are drawn to ad channels where they can geotarget to complement their radio ads.

Figure 3. Top Use of Ad Platforms Among Radio Advertisers



Source: BIA Advisory Services, November 2018

RADIO'S SERVICE ENHANCED WITH ZONED COVERAGE AREAS

Today's broadcast radio stations transmit only to their full licensed coverage areas. Unlike other media channels covered in the previous section, they cannot provide zoned coverage. This leads to a situation where we find most radio listeners exposed to content that's irrelevant to them because it does not affect them where they live. This includes business and political advertisements, traffic reports, and weather information.

With only a full-market coverage footprint, unlike many of its competitors, local radio stations must do their best to address the varying needs of their geographically diverse advertiser and

audience bases. Zoned coverage areas, if permitted, would allow radio stations to do a better job of satisfying these kinds of needs.

In this section, we'll analyze both advertiser and audience preferences for geotargeted advertising and programming.

Advertisers' Preferences for Geotargeting

Let's look first at the geographic targeting interests of businesses that advertise on radio to reach local audiences. According to BIA's Survey of Advertising and Marketing (SAM):

- 76.0 percent rate advertising media that provide geofilter/lenses as providing "excellent" or "extraordinary" ROI (i.e., at least 10 times the return on ad spend).
- 69.8 percent say it is "very important" or "extremely important" to target "consumers in close proximity to their business."
- 59.7 percent of radio advertisers similarly say it is very or extremely important to target "consumers who are in a relevant geographic location."

Of course, even though most local radio advertisers express specific interest and value in geotargeted advertising, this is not a type of advertising product local radio can offer its clients.

Audience Preferences for Services Relevant to their Geography

Let's turn now to the audience and how relevant geographies impact their radio experiences. Based on work conducted by Edison Research it's clear that most radio listeners have endured content on the radio stations they listen to that provide content that is geographically irrelevant to them. For 60 percent of the radio audience, this includes ads for businesses, "so far away that [they] would never visit them," or "advertisements for a politician who does not represent [their] voting district."

The value of radio coverage areas extends beyond audience needs to those of businesses. As we shared above, BIA's research shows that local businesses target customers from a limited geographic area, typically within 10 miles. Businesses understand consumers like to shop locally. The Edison Research corroborates this from the consumer side. For the most part, the relevant trading geography is limited to consumers showing a willingness to travel less than 10 miles.

Businesses that advertise on local radio can reach relevant consumers, but there is a large and expensive "waste" factor of delivering radio ads to consumers who may never visit their retail outlets who live or work outside their trading areas.

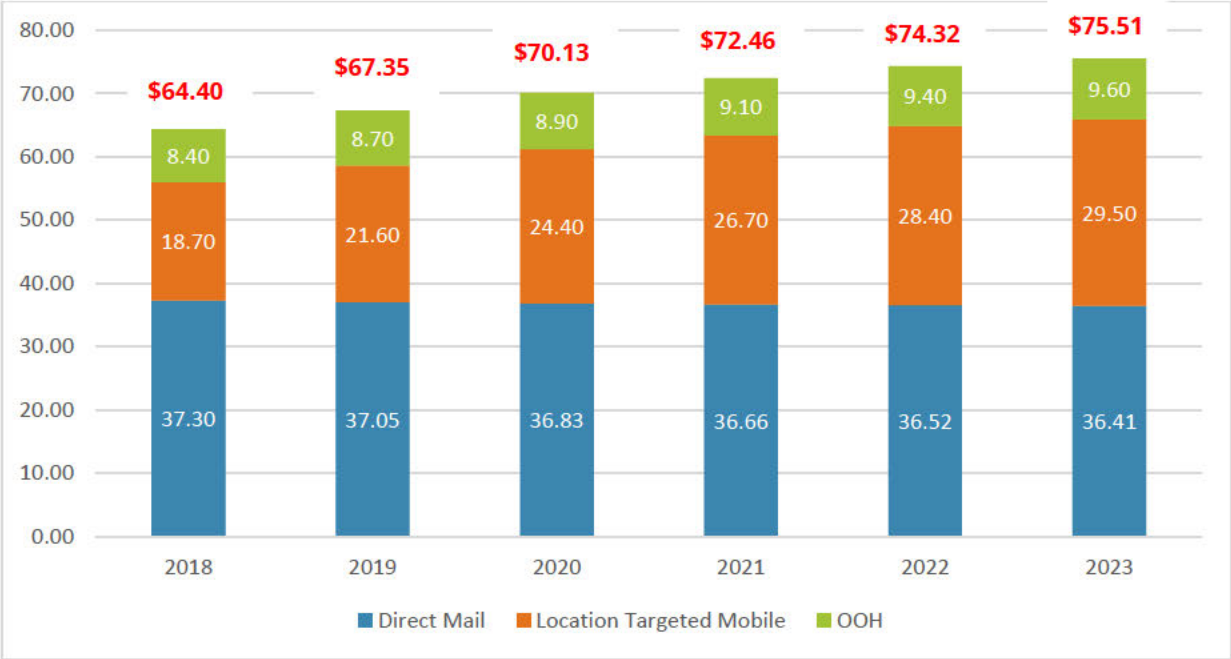
SIZING THE MARKET FOR LOCAL RADIO ZONED COVERAGE

Based on the BIA analysis we detail in this section, in addition to the 25 largest markets, with large geographical areas, there are 38 radio markets that cross state lines and 64 radio markets serving multiple CBSAs within their market geographies. Given the ability to offer zone-based broadcast coverage areas within their overall radio market geographies, local radio can become both more relevant to its audiences and advertisers and more competitive with other media channels. More than half of local radio's advertisers want to geotarget their advertising. And BIA estimates $10 billion in growth across just three of the core location-targeting ad platforms – Direct Mail, Out-of-Home, and Location Targeted Mobile.

In BIA's forecast for local ad spending considering just the three of the location-targeted media platforms of Direct Mail Location-Targeted Mobile, and Out-of-Home, the total spend will grow over $10 billion from 2018 ($64.4 billion) to 2023 ($75.51 billion). Local market zoned advertising sold by newspapers, MVPD operators, will add to this total, though it's difficult to obtain summary figures for these categories. This reflects increasing demand specifically for location-based advertising in local markets. While this segment rises, the broadcast radio segment will fall from $13.2 billion to $12.6 billion in its core over-the-air broadcast advertising.

With a zone-based coverage product for advertisers, local radio stations have a much better chance of selling into a growth segment that might otherwise be inaccessible to them.

Figure 4. Location Targeted Media Spending - Select Categories ($ Billions)



Source: BIA Advisory Services, November 2018

Radio Advertisers Are More Likely to Use Geographic Filters to Target Consumers in Other Media

Local radio is missing an opportunity to better serve its advertisers. Radio advertisers are more likely to use geotargeting in their ad campaigns running in other media than non-radio advertisers.

BIA's SAM survey compares radio versus non-radio advertisers and the geographic areas they use to target their consumers. BIA's data shows that half or more of all businesses that now advertise on radio prefer to geotarget their advertising overall at varying levels including postal codes, cities/counties, and states/regions. Radio advertisers are slightly more likely (58.2 percent) to target consumers at the cities/county level than non-radio advertisers (50.0 percent). Radio advertisers are substantially more likely than non-radio advertisers to use targeted advertising to reach consumers at the postal codes (58.8 percent versus 37.7 percent), state/regions (50.2 percent versus 28.6 percent), and addresses (38.6 percent versus 21.3 percent) geo levels.

This can be an issue for advertisers seeking to complement their advertising messages cross-channel to use geofencing for their ad campaign. Some radio advertising will occur within the

geofenced areas selected for other advertising channels. But their radio advertising will extend to the full coverage areas of the stations sending irrelevant ads to many listeners.

Radio stations in markets spanning multiple state and Core-Based Statistical Areas (CBSAs) boundaries are challenged to serve diverse geographic needs of audiences and advertisers across different communities of interest. This ranges from economic activity centers like CBSAs and all kinds of state level differences ranging from government and politics to a variety of reasons for why people choose residence in one state or city over another within the same media market.

One of the significant benefits of developing zoned broadcast coverage areas for local radio stations lies in the simple fact that many existing radio markets (as defined by Nielsen Audio) cover multiple jurisdictions, by state and economic area boundaries. With a zoned broadcasting system, local radio stations can provide access to audiences that advertisers want to reach in these distinct jurisdictions.

Specifically, there are 38 Nielsen Audio defined radio markets that cross state boundaries in a significant manner.[4] A good example of this is the Washington, DC radio market which spans three distinct political jurisdictions. The table below shows the percentages of the entire radio market in these three jurisdictions.

Table 1. Washington, DC Radio Market Coverage Area by State Population Served

State of Residence	% of Washington, DC Radio Market Population
Virginia	45.8%
Maryland	42.4%
District of Columbia	11.7%

Source: BIA Advisory Services, November 2018

Radio stations located in the Washington, DC radio market trying to sell advertising to potential clients who want to reach only individuals in one of these jurisdictions (e.g., political clients, retailers with outlets in only one jurisdiction) are "forced" to provide access to their listeners no matter where they reside.

This oversupplying of listeners does not only occur due to political boundaries, but economic as well. There are 64 Nielsen Audio radio markets that have two or more Census defined Core Based Statistical Areas (CBSAs)[5], reflecting multiple economic areas.

A good example of a multiple CBSA Nielsen Audio radio market is the Greenville-Spartanburg, SC market. The table below shows the percentages of the how the radio market's population distributed across the three CBSAs that are within its borders.

Table 2. Population Distribution by City for Greenville-Spartanburg Radio Market

CBSA	% of Greenville-Spartanburg, SC Radio Market Population
Greenville, SC	55.68%
Spartanburg, SC	26.81%
Anderson, SC	17.51%

Source: BIA Advisory Services, November 2018

Potential advertisers located in only one of these CBSAs might only want to reach potential customers located in only one of these areas.

USE CASES FOR LOCAL RADIO ZONED COVERAGE AREAS

- **News and Informational Programming:** Radio stations can use broadcast zones to send different transmissions with program content relevant to those geographies that may border along state, city, or other meaning boundaries. A Dallas, TX radio station could provide different news feed to Dallas and Ft. Worth listeners for example. Weather, traffic, and other news content can be targeted to the most relevant zones.

- **Advertising:** Unbundling advertising opportunities from only full market coverage to offer zoned broadcasts enables local stations to provide two new ad products to the marketplace. First, smaller businesses who cannot afford and may not need full market radio coverage due to the geographic trading area they serve, can take advantage of lower priced radio zoned advertising. Second, even larger regional or national marketers may want to take advantage of zoned radio advertising to tailor their creative messaging to appeal to residents and businesses in different states and CBSAs to increase their

relevance and impact. This is especially important for radio to be more competitive with digital and television media.

- **Public Service Announcements:** Groups that rely on local radio to help promote their public service causes, much like commercial advertisers, can benefit from more geographically targeted radio advertising. For example, charitable groups and other public service agencies that are organized along state-level or CBSA lines will find it much more effective for their outreach efforts to target audiences in these more relevant geographies.

- **Spanish and Other Languages:** In many markets, there are geographic clusters with high densities of people who don't speak English as their first language. In multi-generational homes, there's often a mix of bilingual, even multilingual people that may or may not speak English as their preferred language or perhaps not speak English at all. Radio broadcasters with zoned broadcasting capabilities can provide zone broadcasts to these geofenced areas featuring programming and advertising offering a mix of English language, Spanish language or other languages as best suits the needs of the community.

- **Programming:** Local government, civic events, entertainment, and other information relevant to specific geographies within markets cannot be prioritized by radio broadcasters limited to single coverage area.

- **Emergency Alerts and Warnings:** Local radio stations are part of national, state, and local critical infrastructure for issuing alerts and warnings. One of the major challenges for public safety and emergency management officials is getting the right message to the right members of the public at the right time. Within radio market geographic boundaries often there will be multiple zones where weather, flood warnings, traffic, and other public safety incidents may arise where local citizens need to be warned. Sending out mass alerts and warnings to everyone in a radio market creates a situation where those not in affected geographies start ignoring these warnings. This is not a desirable outcome for anyone. With zoned coverage areas, local radio stations can do a better job of alerting listeners most likely to be impacted by breaking situations.

SCENARIOS: ZONED ADVERTISING IMPACT ON RADIO REVENUE

BIA Model for Industry Impact of Zoned Radio Advertising

In order to gauge the potential revenue impact, we constructed a model using BIA's radio market level revenue estimates.[6] We specifically modeled the markets in which the radio markets include multiple states as well as multiple CBSAs. Additionally, we modeled the other top 25 ranked radio markets not included in that other group as those markets are quite large[7] and thus might be ripe for zone advertising in different regions of the market.

There are 1,900 commercial radio stations located in the radio markets that cross state boundaries and/or include multiple CBSAs. These markets collectively generated $2.75 billion in over-the-air advertising revenue in 2017. Additionally, the other top 25 ranked radio markets not included in that other group has 1,019 commercial radio stations generating $3.85 billion in over-the-air advertising revenue in 2017.

To generate the impact on revenue from zone advertising, we made these assumptions:

1. Percentage of radio stations in the multi-state/multi CBSA radio markets that will offer zoned advertising. In part, we base our assumption here on how many stations in a market adopt zoned advertising solutions and therefore share the infrastructure costs of the zoned transmission system. The more stations participating, the less expensive it is per station.

2. Percentage of market revenue accounted for the local radio stations in these multi-state/multi CBSA markets that will offer zoned advertising.

3. Percentage of radio stations that will zone advertise in the other top 25 ranked radio markets that are not part of the other group.

4. Percentage of market revenue accounted for the local radio stations in these other top 25 ranked radio markets that are not part of the other group that will offer zoned advertising.

5. Percentage of spots that will be in zoned advertising inventory. The demand for radio spots overall is soft. We expect that some inventory that would otherwise remain unsold may be sold in part or whole as zoned spots.

6. Percentage premium to be charged for the zoned advertised spots. We see premium value will result from revenue generated by filling in for unsold and per response ads.

The following table shows the impact that varying the assumptions listed above will have on the additional annual revenue generated from zone advertising. The impact of zone advertising estimated below may be conservative as it only examines the multi-state/multi CBSA and other top 25 ranked markets. There may be radio stations located in other markets that would find zone advertising advantageous.

Table 3. BIA Model for Industry Impact of Zoned Radio Advertising

Model Parameters	Example 1	Example 2	Example 3
2017 Total Over-the-Air Adv. Revs. (000s)	$6,603,425	$6,603,425	$6,603,425
% of Stations Zone Advertising in Multi-State/Multi CBSA Markets	20%	30%	35%
% of Market Revs. Attributable to the Zone Advertising Stations	40%	60%	70%
% of Stations Zone Advertising in Other Top 25 Ranked Markets	25%	35%	40%
% of Market Revs. Attributable to the Zone Advertising Stations in Other Top 25 Ranked Markets	50%	70%	80%
% of Spots that are Zone Advertised	20%	25%	30%
% Premium for Zone Advertising	30%	40%	50%
Additional Revenue (000s)	$181,604	$434,743	$751,165

Source: BIA Advisory Services, November 2018

While these estimates vary substantially depending upon the assumptions made, the model illustrates the potentially significant incremental impact that zone advertising can have on the financial health of the participating radio stations. There are some additional one-time capital and annual operating costs incurred with zone advertising, but much of the annual additional revenue will fall to the bottom line thereby increasing the value of these radio stations by a much higher percentage. Moreover, the ability to zone advertise will allow these local radio stations to compete more effectively with other advertising platforms and stem the tide of declining revenue being experienced by the radio industry.

CONCLUSION

Local radio faces slow but steady declines in revenue forecasts. Once local TV stations transition to ATSC 3.0 with its capability of geotargeted content delivery, local radio stations will be the only electronic media channel not able to offer any form of geotargeting within its authorized broadcast coverage areas.

Some of the major opportunities local radio stations can achieve by developing zone-based coverage areas include advancing both economic and service outcomes such as:

- Selling into the growing market of geotargeted and location-based ad spend by local, regional and national advertisers.
- Support public safety services for zoned radio broadcasting such as alerts and warnings issued only to impacted zones versus the full market for more relevance and engagement.
- Local radio stations address unmet needs of its advertisers, audiences for zoned advertising and news editions.
- Improved the competitiveness of local radio in local marketing.

Some of the challenges facing local radio stations who want to develop and provide zone broadcast coverage areas include the need for FCC authorization and an assessment of the economics of implementing such systems.

Overall, BIA concludes that local radio stations need to develop more innovative and competitive responses for local market audiences and advertisers to achieve significant growth. We don't see local radio's online activities alone supporting these objectives. However, by offering a fundamentally new product such as zoned advertising, radio can be better positioned to compete with MVPDs, newspapers, direct mail and eventually ATSC 3.0 television stations for the projected $75 billion in Location Based Advertising that is currently unavailable to them.

ABOUT THE AUTHORS

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Rick Ducey is managing director, leading BIA's strategy consulting practice. Ducey also serves as practice lead and adviser to an affiliated investment banking firm, BIA Capital Strategies. He assists clients with their business planning and revenue models, strategic research, market assessment, and designing and implementing strategies for leveraging video media assets and inventory in local markets. Ducey is a sought-out expert for his coverage and analysis of how disruptive technologies, emerging competition, shifting consumer demographics and media usage trends drive changes in the media ecosystem. He also co-founded SpectraRep, the leading provider of alert and warning datacasting solutions, applications, and systems primarily for public sector clients.

Prior to BIA, Ducey was senior vice president of NAB's Research and Information Group. He has taught on the faculties of George Washington University, Michigan State University, George Mason University and the University of Maryland. Ducey received his B.A. from the University of Massachusetts at Amherst, M.S. from Syracuse University, and Ph.D. from Michigan State University.

MARK FRATRIK, PHD.
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Mark Fratrik serves as BIA/Kelsey's chief economist and is responsible for forecasting across all local media segments. He also manages the company's numerous proprietary databases and conducts primary research on various trends as they affect the broadcasting and related communications industries. Additionally, Mark is heavily involved in BIA/Kelsey's strategic and financial consulting projects, conducting research and analysis for clients on matters related to the broadcasting, digital media and related communications industries. He is often quoted in the media and is a leading spokesperson concerning trends and forecasts for the media industry including analyzing competitiveness of media and related industries. He is the author BIA/Kelsey's series of studies on the state of the radio and television industry.

Mark received his Bachelor of Arts in mathematics and economics from State University of New York at Binghamton and his master's and doctoral degrees in economics from Texas A&M University. He served as an adjunct professor of economics at Johns Hopkins University for more than seven years.

ABOUT BIA ADVISORY SERVICES

BIA is the leading research and advisory firm focused on the advertising and marketing marketplace. We deliver research, forecasts, analysis, competitive intelligence and market strategies produced by our team of analysts, strategists, economists, data scientists and digital and traditional media industry experts.

Our proven advisory services and consulting methods put our clients in the best possible position to compete and stand out in today's multiplatform, interactive world.

We are pleased to announce our Programmatic Program that features a series of papers and webinars that will help our clients understand the potential of programmatic.

We also publish an advertising intelligence platform, BIA ADVantage. Contact us today for more details: info@bia.com.

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ENDNOTES

[1] Nielsen, *Audio Today 2018: How America Listens*, 2018, p. 2.
[2] Ben Sisario and Tanzina Vega, "Pandora Courts Local Advertisers by Offering Well Defined Listeners," *New York Times, https://www.nytimes.com/2012/04/16/business/media/pandora-courts-local-advertisers-by-reaching-a-narrow-audience.html.*
[3] Rick Greenhut, " HD Radio – Driving Radio's Digital Dash,' Radio Matters, RAB blog, April 30, 2018. http://www.radiomatters.org/index.php/2018/04/30/hd-radio-driving-radios-digital-dash/.
[4] We define a significant manner by having at least 10% of the total radio market population residing in multiple states.
[5] Core-Based Statistical Areas (CBSAs) are areas defined by the Census Bureau to reflect common economic areas. Some of these CBSAs are sometimes referred to as "metro areas."
[6] BIA Advisory Services, LLC maintains a database of all commercial and noncommercial radio and television stations, Media Access Pro™. Included in that database are estimates of over-the-air advertising revenue generated by these radio and television stations, and thus, market level totals for this revenue source.
[7] The average top ten radio market is 5.7 million sq. ft and markets ranked 11 through 25 is 6.6 million sq. ft. in area, much larger than markets ranked lower.

EXHIBIT D


What does it mean to be...
LOCAL?
Radio's Big New Opportunity
GEO BROADCAST SOLUTIONS
edison research

What does it mean to be...

LOCAL?

GEO BROADCAST SOLUTIONS

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Survey of 1051 Americans

Ages 18 and older in the top 100 markets

Conducted in Summer 2018

All respondents listen to "over-the-air" AM/FM radio at least once/month

Sex, age, ethnicity, and geography weighted to match national population

How far do you typically travel to...

GEO BROADCAST SOLUTIONS

edison research

Source: Edison Research - 2018 Survey of radio listeners age 18+ in top 100 markets

57%
use radio for
weather

50%
use radio for
traffic

58%
use radio for
local* news

*within 20 miles

52%
use radio for
metro* news

*greater metropolitan area

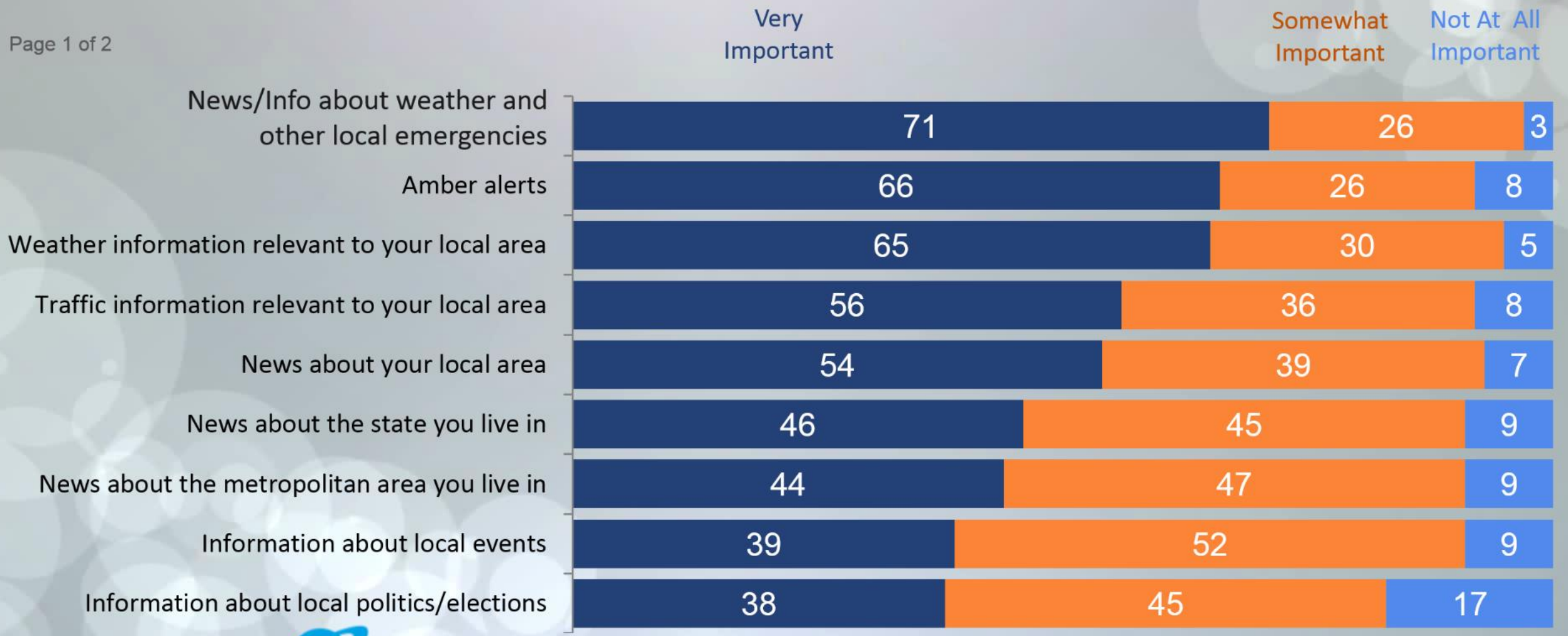
GEO BROADCAST SOLUTIONS

edison research

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

46%
use radio for
local events

How important is it that AM/FM radio provide...?



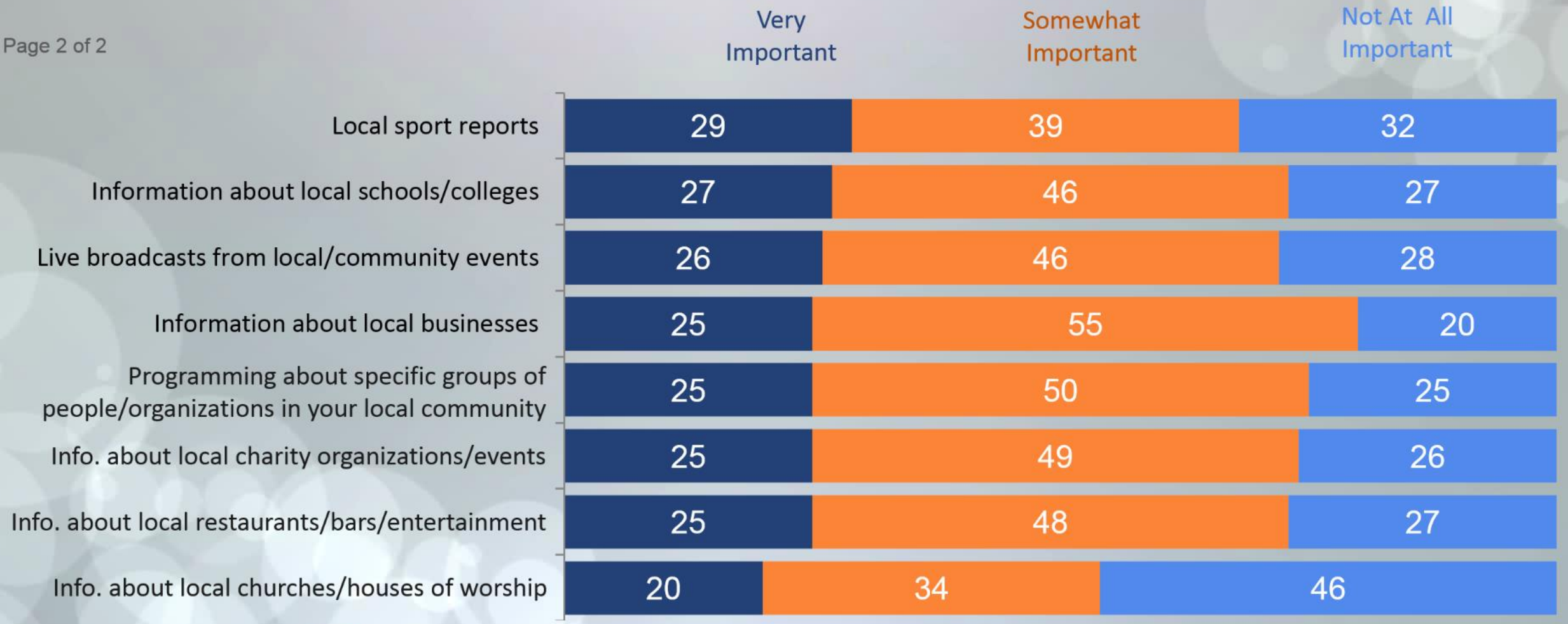
GEO BROADCAST SOLUTIONS

edison research

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners age 18+ in top 100 markets

How important is it that AM/FM radio provide...?



GEO BROADCAST SOLUTIONS

edison research

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners age 18+ in top 100 markets

Emergencies

% saying it is "very important" for radio to provide news/info about weather and other local emergencies

71%

% saying radio is doing a "very good job" providing news/info about weather and other local emergencies

42%

GEO BROADCAST SOLUTIONS

research

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

Local Weather

% saying it is "very important" for radio to provide weather relevant to your area

65%

% saying radio is doing a "very good job" providing weather relevant to your area

40%

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edison

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

Local Traffic

% saying it is "very important" for radio to provide news/info about traffic relevant to your area

56%

% saying radio is doing a "very good job" providing traffic relevant to your area

38%

GEO BROADCAST SOLUTIONS

research

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

Local News

% saying it is "very important" for radio to provide news about your local* area

54%

% saying radio is doing a "very good job" providing news about your local* area

31%

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

Local Events

% saying it is "very important" for radio to provide information about local events

39%

% saying radio is doing a "very good job" providing information about local events

26%

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

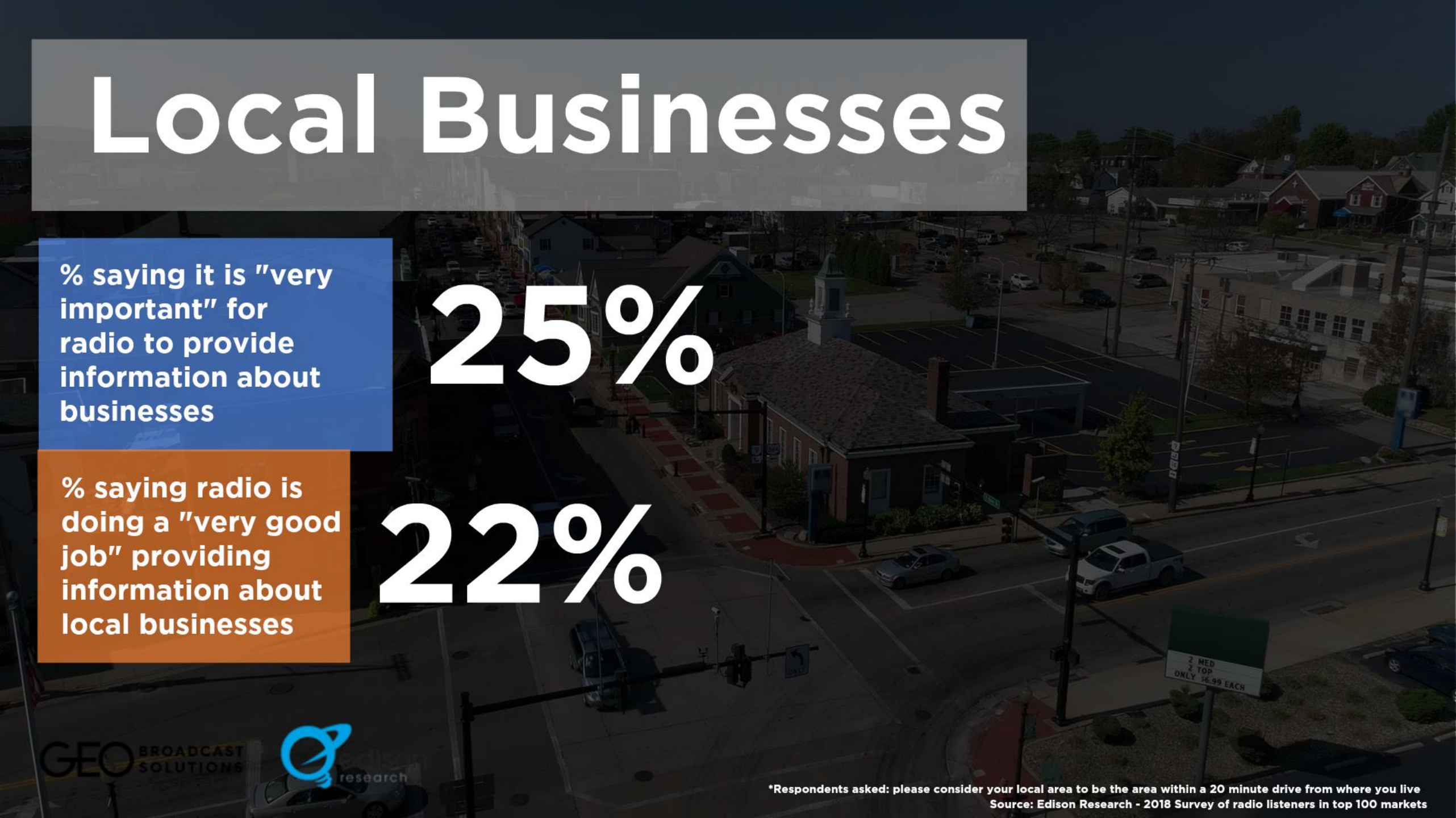
Local Businesses

% saying it is "very important" for radio to provide information about businesses

25%

% saying radio is doing a "very good job" providing information about local businesses

22%



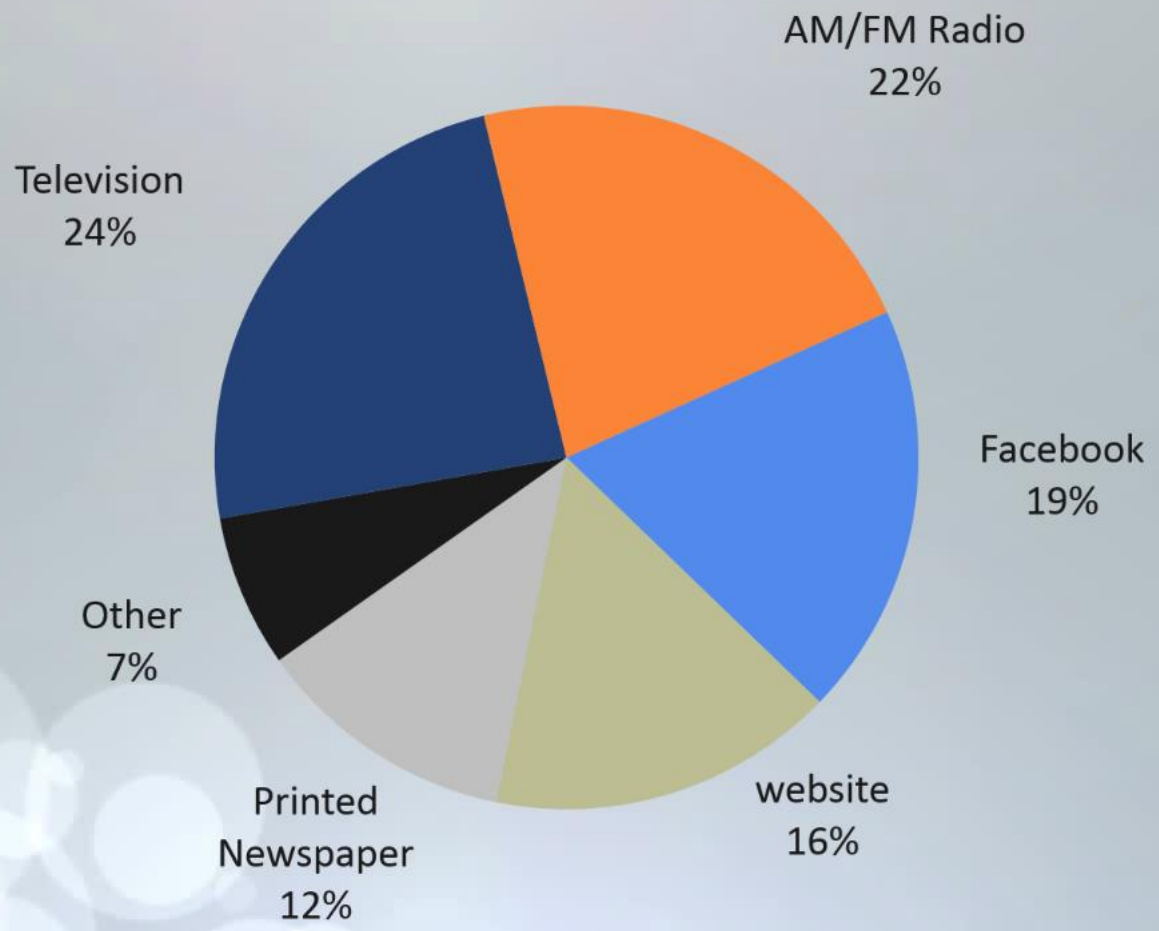
GEO BROADCAST SOLUTIONS

research

*Respondents asked: please consider your local area to be the area within a 20 minute drive from where you live

Source: Edison Research - 2018 Survey of radio listeners in top 100 markets

Which is your primary source for local events?



GEO BROADCAST SOLUTIONS

edison research

Source: Edison Research - 2018 Survey of radio listeners age 18+ in top 100 markets

How much do you agree/disagree...

"You would pay more attention to ads on the radio if they were for business or products in your local area."

Strongly Agree/Agree:

77%

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How much do you agree/disagree...

"You would listen to AM/FM radio more if the information/ commercials were better targeted to your local area."

Strongly Agree/Agree:

72%

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What does it mean to be...
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